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BIRDS
of the
NAVAJO COUNTRY
by
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CHRONOLOGY OF EXPEDITIONS

- 1851 Sitgreaves expedition (Woodhouse, 1853) down Zuni, Little Colorado and Colorado rivers. (Oct. 1-7 on Little Colorado.)
- 1853 Whipple expedition (Kennerly and Mollhausen) on 35th parallel on Pacific RR survey from Santa Fe to San Francisco, Dec. 5-20 on Little Colorado (Baird, 1854).
- 1858 Ives expedition (Mollhausen) through Moqui Villages to Fort Defiance (Baird, 1861).
- 1873-4 Wheeler expeditions skirt Navaho Country (Henshaw, 1875).
- 1889 C. H. Merriam trips from San Francisco Mts. to Oraibi, Aug. 12-19, and to Tuba City, Sept. 20-27 (Merriam, 1890).
- 1892 C. P. Rowley collection of birds on San Juan River, Utah, for American Museum, April and May.
- 1893 C. P. Streater trip along Little Colorado from Holbrook to Winslow, April 19 to May 7 (U S B S).
- 1893 J. Alden Loring trip to Bluff and Noland's Ranch on San Juan River. Nov. 8-27.
- 1894 A. K. Fisher trip from Holbrook to Hopi villages, July 15 to Aug. 8 (Fisher, 1903).
- 1900 Jones and Dawson trip via Little Cottonwood to San Francisco Mts. (Wils. Bull., 33:1-39).
- 1903 A.O.U. trip to California (Chapman, 1903): Chapman, Fuertes, et al.
- 1909 E. W. Nelson and Clarence Birdseye trip, Winslow via Fort Defiance to Lee's Ferry, July 10 to August 26.
- 1916 M. P. Skinner trip, Holbrook to Keams Canyon, Chin Lee and Fort Defiance, Sept. 12 to Oct. 8.
- 1917 E. A. Goldman trip, Little Colorado (near Cameron) to Chin Lee and Tunicha Mts., Fort Defiance and Rio Puerco.
- 1927 G. G. Cantwell and Paul E. Trapier trip to Tunicha and Lukachukai Mts., June 5-26 plus.
- 1927 B. Y. U. field trip from Bluff via Tuba City to Lee's Ferry, July 2-7.
- 1931 W. P. Taylor on Little Colorado 25 miles south of Marble Canyon Bridge, Aug. 25.
- 1931 University of Utah expedition of Oct. 23-31: at Bluff on San Juan River, Oct. 27.
- 1933 University of Utah expedition of May 6-14: at Bluff on San Juan River, May 10-12.
- 1933 S. B. Benson reconnaissance of Navajo Mt., Utah, June 10-26.
- 1933 R. Jenks visit to Navajo country, June 20-26.
- 1933-38 Summer trips of Rainbow Bridge-Monument Valley expeditions.
- 1934 J. O. Stevenson near Oraibi, July 29.
- 1934-36 Milton Wetherill at Betatakin, Kiet Siel and Kayenta.
- 1935 University of Utah expedition to San Juan River, April 27 to May 3
- 1936 A. R. Phillips trips to Tuba City, July 2-9, and Tsegi, Aug. 13.
- 1936-39 Gale Monson in Navajo Country.

INTRODUCTION

The Navajo country as covered in this paper lies in southeastern Utah and northeastern Arizona and is bounded on the north, west and south by the San Juan, Colorado, Little Colorado and Rio Puerco rivers and on the east by the Arizona-New Mexico state line. That part of the Navajo country lying in northwestern New Mexico, while not covered in this paper, is ecologically similar and is probably but little different faunistically.

Topographically, the area may be characterized as spectacular, with emphasis on colored landscapes of desert mesas, canyons and isolated mountains. Climatically, the rainfall and humidity are excessively low, the sunshine bright and the temperature extremely variable and wide-ranging. The low precipitation is correlated with scanty vegetation and sparse faunistic populations. The great quantities of bare rock, ledges and cliffs emphasize the rock-inhabiting species.

The investigations which led to the present work began in the Rainbow Bridge-Monument Valley expeditions during the summers of the years 1933 to 1938, initiated and conducted during the first five years by Ansel F. Hall, then of the National Park Service, and during the last year by Dr. Charles D. Winning of New York University. The area covered by the expeditions was mainly limited to the area from Tuba City and Kayenta north to the San Juan and Colorado rivers, and included only a small part of the area covered by this report. In addition to the area indicated, the records from a trip to the Kaiparowits Plateau in Kane County, Utah, north of Colorado River, are included.

The writers originally designed this work as a report of the ornithological investigations of the R B - M V expeditions. After the manuscript was prepared, Allen R. Phillips kindly offered the available data he had collected in preparation for his forthcoming work on the birds of Arizona if they would enlarge the scope of the work to include all of the Navajo Country in Utah and Arizona. This was further supplemented by data which Woodbury and Clarence Cottam had collected for their work on the birds of Utah. This was still further supplemented by Gale Monson's numerous records from the Navajo Country. Inclusion of this material necessitated enlargement and almost complete revision of the first manuscript. To all of these sources, the writers are much indebted.

Thanks are also due to the following institutions: Navajo Indian Service, Museum of Northern Arizona, American Museum of Natural History, U. S. Biological Survey, Museum of Vertebrate Zoology, University of Utah, University of Kansas, and Grand Canyon Museum for various services and records.

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HISTORICAL BACKGROUND

The Navajo area is so isolated geographically that but few ornithological investigators have penetrated it in depth and another few have skirted its margins. Some of them have gone into the area primarily for ornithological study, but in other cases birds have been minor considerations and ornithological reports were only by-products of expeditions undertaken primarily for other objectives. The earliest of all ornithological investigations in the area were of the latter type.

Early Expeditions

The Sitgreaves Expedition (Woodhouse 1853:58-105) down the Zuni and Colorado rivers in 1851 skirted the Navajo Country on the south as the members passed down the Little Colorado River from the mouth of the Rio Puerco (near Holbrook) October 1 to Grand Falls October 7, where they turned off toward the San Francisco Mountains.

The Whipple Expedition (Baird 1858:XLV) exploring routes for a railroad from the Mississippi to the Pacific along the 35th parallel, also skirted the area covered in this report between December 5 and 20, 1853, while the members were passing down the Little Colorado River from Holbrook to a point beyond Leupp, where they also turned off toward the San Francisco Mountains. The birds collected by Kennerly and Mollhausen along this section of the river (11 species) are included in a list prepared by Baird (1854, 7:118-120).

The Ives Expedition of 1857-58 to explore the navigability of the Colorado River reached the Navajo Country in May, 1858. Coming from the San Francisco Mountain region, the members reached Flax River (Little Colorado) up which they traveled until they found an Indian trail that led them north to the Moqui villages by May 11. They visited leisurely among the villages as they moved toward Fort Defiance, which they reached on May 23. The birds collected by Molhausen on this part of the trip (12 species) are all listed from Fort Defiance in Part 5 of the report prepared by S. F. Baird (1861:5-6).

The Wheeler explorations and surveys in 1871 swept southward through Nevada, touching corners of Utah and California, then across Arizona to Camp Apache, but much of the material collected that year was lost in the great Chicago fire. The expedition concentrated on Utah in 1872, and Colorado, New Mexico and Arizona in 1873-4. The 1871 expedition missed the Navajo Country but those of both 1873 and 1874 skirted it. Henshaw and Newberry left Fort Wingate (near Gallup, N. M.), July 19, 1873, and arrived at Camp Apache, Arizona, August 2, passing leisurely en route, probably along the Rio Puerco. The rest of the season was spent farther south. The same route was traversed rapidly in both directions in 1874, but probably no specimens were taken.

The Merriam biological survey of San Francisco Mountains was carried out in 1889. During the course of the survey, C. H. Merriam and Vernon Bailey made two trips into the Navajo Country. On the first trip, made August 12 to 19, inclusive, they crossed the Little Colorado River at Grand Falls and followed up Tenebito (Dinnebito) Wash to a point about 16 miles north of Oraibi, where they reversed direction and returned via Oraibi and a new trail to Grand Falls and thence back to San Francisco Mountains. On the second trip, from September 20 to 27, they

crossed the Little Colorado River at Tanner's crossing near Cameron, then on to Echo cliffs at Moa Ave (Moanave), Tuba City and Tanner's Gulch (Pasture Canyon), after which they returned via Moencopi village, and Moencopi Wash to the Little Colorado River. Birds collected on these trips were reported by Merriam (1890:87-101).

Ornithological Investigations

These preliminary explorations served as a prelude to many other visits from different directions that descended upon the Navajo Country from time to time down through the years. C. P. Rowley in 1892 visited the San Juan River in Utah and made a collection of bird skins for the American Museum of Natural History in New York. He was at Noland's Ranch near 4-Corners April 19-22, at Riverview April 23-May 4 and at Bluff May 5-25.

The next spring (1893), Clark P. Streater made a leisurely trip along the Little Colorado River for the U. S. Biological Survey from Holbrook to Winslow from April 19 to May 7. Another investigator from the U. S. Biological Survey, J. Alden Loring, in the fall of the same year 1893, approached the Navajo Country from the north along the San Juan River in Utah where Rowley had been the previous year. He was at Bluff November 8-15, and at Noland's Ranch November 17-27.

A. K. Fisher made a special trip into Keams Canyon and the Hopi villages in 1894 from Holbrook. His itinerary shows that he was at Holbrook July 15-17, at Keams Canyon and the villages July 17-August 3 and Holbrook again August 4-8. He reported the birds encountered, in the Condor (1903:33-36). Jones and Dawson while making a summer reconnaissance of the west passed down the Little Colorado River on their way to the San Francisco Mountains and reported their trip in the Wilson Bulletin (1900:1-39).

Another expedition that merely skirted the area was the A. O. U. trip to California in 1903, on which the group stopped at Adamana May 7 to bird awhile and to visit the Petrified Forest. Some skins were taken by L. A. Fuertes and Chapman reported the trip in Bird Lore (1903:99).

One of the most extensive trips into the Navajo Country in the early part of this century was that of E. W. Nelson and Clarence Birdseye of the U. S. B. S., who crossed through the middle of the area July 10 to August 26, 1909. It seems that they reached Winslow July 10. Birdseye was at French's Ranch July 11-22 and Nelson stayed at Winslow July 10-25, except for a short trip to a point 15 miles west of Sunset Pass July 15-16. Birdseye was back at Winslow July 22-25, when he left by wagon for Manuelito, New Mexico, en route July 25-29. Nelson was at Holbrook July 25-28 and then joined Birdseye at Manuelito July 29. Next day they both left together by wagon for a trip across country. They reached Fort Defiance July 30, the Indian Agency Sawmill 15 miles to the northwest July 31, Chin Lee on August 2, Canyon de Chelly August 4 (at White House Ruin), back through Chin Lee to Mesa on the way to Keams Canyon via Eagle Crag August 7-8, Keams Canyon August 9, Walpi August 10, Oraibi August 11, a mesa 18 miles west August 12, Tuba City and vicinity August 14-20, Cottonwood tank on Cedar Ridge August 21, at Lee's Ferry August 22-26, and then on northwest toward Kanab, Utah. The skins collected are in the U. S. Biological Survey collection.

- Milton P. Skinner of U. S. Biological Survey made a trip through the Navajo Country September 12 to October 8, 1916. His route seems to have led him north from Holbrook September 12, via Cedar Springs to Keams Canyon September 15-17, somewhere west of Ganado 19-20, around Chin Lee 21-25, east of Chin Lee 26, near Fort Defiance 27, around St. Michaels 28-29 and near Navajo and Adamana October 5-6.
- E. A. Goldman, also of the U. S. Biological Survey, made a trip into the same general region nearly a year later in 1917. He was on the Little Colorado River between Moencopie Wash and Winona July 31, at Chin Lee August 17, Canyon del Muerto 18-19, in Tunicha Mountains 21-23, and back in Chin Lee August 26.
- Ten years later, in 1927, G. G. Cantwell and Paul Trapier visited the Tunicha Mountains at least from June 5-26. Their collections are in the U. S. Biological Survey series.
- A Brigham Young University group including Dr. V. M. Tanner and Clarence Cottam, then a student, made a trip through the area from Bluff to Lee's Ferry about the same time, July 2-8, 1927. They were in Bluff July 2, Monument Valley, Utah, July 4, Monument Valley, Arizona, July 5, and around Tuba City July 7. The skins are at B. Y. U., Provo, Utah.
- Walter P. Taylor took some skins on the Little Colorado River about 25 miles south of Marble Canyon Bridge Aug. 25, 1931.
- The University of Utah had three collecting expeditions which reached the San Juan River in 1931, 1933 and 1935. The skins are in the University Museum of Zoology. The first expedition October 23-31, 1931, was at Bluff October 27-28 and the second May 10-12, 1933. The third expedition was at Bluff, April 28-30 and May 3; on the north rim of San Juan River twelve miles west of Mexican Hat May 1, and in John's Canyon twenty-two miles northwest of Mexican Hat May 1-2, 1935.
- S. B. Benson, from the M. V. Z., University of California, made a biological reconnaissance of Navajo Mountain June 10-26, 1933. He had five stations, one on the mesa five miles south of the mountain June 10-12, one at War God Spring on top of the mountain at 8400 feet June 13-20, one at Rainbow Bridge in Bridge Canyon June 21-24, and two on the mesa south of the mountain, one at and one near Navajo Mountain Trading Post, June 25-26.
- Randolph Jenks visited the Navajo Country at least during June 20-26, 1933. James O. Stevenson was near Oraibi July 29, 1934.
- Milton Wetherill took many records of birds and obtained a few skins while stationed at Betatakin as a Park Service Guard 1934-37 and further records on his many visits to Kayenta later. Allan R. Phillips gathered both skins and records of observations on his trip to the Tuba City region July 2-9, 1936, and to the Tsegi Canyon August 13.
- Gale Monson gathered many records from many places in the Navajo Country as a by-product of his travels for the U. S. Soil Conservation Service while stationed in that region from 1936-39. His records are so numerous that they cannot all be cited in this work.

THE RAINBOW BRIDGE - MONUMENT VALLEY EXPEDITIONS

From time to time during the late twenties and early thirties, proposals were made to set aside much of the spectacular northern part of the Navajo Country as a national park. Insufficient information about the area stimulated Ansel F. Hall, then of the National Park Service, to investigate. In 1933, he organized an expedition to explore the area lying between the Rainbow Natural Bridge (north of Navajo Mountain) and Monument Valley. The expedition from mid-June to mid-August was designed to make a preliminary reconnaissance of the area and gather such scientific data as was convenient. The party included photographers, engineers (map-making), geologists, archaeologists, ethnologists, botanists, entomologists, herpetologists, mammalogists and ornithologists besides the leaders, physicians, cooks, drivers and guides.

The work in mammalogy and ornithology was conducted by L. Morgan Boyers, assisted by Torrey Lyons and Ralph H. Fisher. The work was handicapped by the hurried nature of the reconnaissance trips, but forty-four bird skins (now at M. V. Z., University of California) were prepared. This work was supplemented by L. L. Hargrave of the Museum of Northern Arizona in charge of the archaeological work who was also interested in birds.

The success of this first expedition stimulated succeeding ones which continued until 1938. In 1934, the expedition spent most of the summer in one of the canyons of the Tsegi drainage and collections were made chiefly there and on the surrounding mesas by H. N. Russell, Jr., and L. L. Hargrave, and observations were made by Dr. R. C. Teall. In 1935 the greater part of the summer was spent in other canyons of the Tsegi drainage, particularly Long Canyon and Bubbling Springs Canyon, and then the period from August 9 to 17th in the neighborhood of War God Springs on Navajo Mountain. Collections and observations were made by Russell and William Kiss.

In 1936 Russell and P. A. Hendrickson worked together with other biologists, reaching the Marsh Pass base camp on June 29 and camp on Navajo Mountain on July 1st. The next three weeks were spent in the pine and spruce-fir forests of Navajo Mountain and the last week in July on the flats at the base of Navajo Mountain. The first two weeks of August were spent in Beaver Creek Canyon at the north foot of the same mountain in dense deciduous growth along a tiny stream, and the period from August 14 to August 20 in the low, hot desert of Monument Valley. In addition, Torrey Lyons accompanied a boat expedition down the San Juan and Colorado Rivers from Mexican Hat to Lee's Ferry during the period of July 4 to July 22, making a small collection.

In 1937, Woodbury and Kiss did the ornithological work, reaching Marsh Pass base camp on July 2, spending the period from July 3 through July 13 in Monument Valley and descending the San Juan and Colorado Rivers by boat to Rock Creek Canyon, which was reached by July 20. One week was spent there and the period from July 27 through August 13 on the nearby Kaiparowits Plateau in Kane County, Utah.

Woodbury left the party August 7 and by rapid travel via Escalante, Bryce and Zion Canyons, Kaibab Forest and Tuba City, returned to Marsh Pass August 9. He spent the period August 10-17 in general reconnaissance, including an airplane trip from Gouldings over Elk Ridge, Henry Mountains, Kaiparowits Plateau and Navajo Mountain, a visit to Museum of Northern Arizona, and a trip to Fort Defiance and Hopi villages. Such rapid travel allowed but few specimens to be taken.



FIG. 1. AERIAL VIEW OF RAINBOW BRIDGE WHICH RISES 308 FEET ABOVE CANYON BED. INSPIRATION FOR ONE HALF OF THE NAME OF THE RAINBOW BRIDGE-MONUMENT VALLEY EXPEDITION.

—Expedition Photo.

In 1938 Russell reached Cameron on June 23, spent one day in the lower Moencopi wash and then worked around Marsh Pass in the pigmy forest of the slopes of Black Mesa from June 25 to July 3, chiefly collecting a series of *Thryomanes bewicki*. Woodbury and Russell, from July 2 to 25, worked the whole length of the Kletthla Valley from Kayenta to Tuba City, especially about the tanks and reservoirs and on the open brush flats and rare corn fields, including also the unique cat-tail marshes in Pasture Canyon, near Tuba City. The period from July 29 through August 11 was spent in a boat trip down the San Juan River for forty-five miles, and down the Colorado River for seventy-five miles to Lee's Ferry, Arizona, a distance of 120 miles through the canyons, collecting specimens of the very limited fauna which occupies the narrow willow-covered bars which line the river banks.

The period from August 11 through 22 was spent in the same area studied July 2 to 25 period, i.e., along the valleys from Kayenta to Tuba City, especially about the few bodies of water.

Finally Russell made a brief visit on September 6 and 7 to the Tuba City and Pasture Canyon area.



FIG. 2. VIEW IN MONUMENT VALLEY SHOWING TOTEMPOLE IN CENTRAL FOREGROUND AND SURROUNDING HEADLANDS AND MESAS. INSPIRATION FOR THE OTHER END OF THE NAME.

—*Expedition Photo.*

ECOLOGICAL HABITATS

Aquatic Habitats

In a desert region such as the Navajo Country, aquatic and terrestrial bird habitats are usually sharply divided with but little, if any intermediate gradations. Permanent springs, creeks and ponds are few in number. Rivers arising in distant mountains and flowing through the low valleys and canyons skirt the area and form the boundaries on the north, south and west. Temporary pools, ponds and lakes arise in various places after rainstorms. Artificial reservoirs add to the number of both permanent and temporary lakes and ponds scattered in special places where water from either temporary or small permanent streams is stored, mainly for stock-watering purposes; in a few cases for irrigation.

The rivers and many of the smaller streams are nearly always muddy, especially during high water in spring or flood stage in late summer. Food suitable for birds is relatively scarce in such streams, all of which are subject to great fluctuation and thus have no stable shore lines. Over most of the Navajo Country, these ponds and reservoirs are used for stock watering purposes and are thus subjected to excessive grazing which effectively prevents any rank growth of vegetation around the shores. In fact, most of them are bare. An exception is the upper reservoir in Pasture Canyon, which has been protected by fence for many years and bears dense stands of rushes and cattails in shallow water and sedges and grasses along the shores.



FIG. 3. SCENE ON COLORADO RIVER. A STREAM-SIDE THICKET BETWEEN THE RIVER AND THE SANDSTONE HILLS. THE AVIAN FAUNA IS VERY SPARSE.

—Expedition Photo.

Surface-feeding swimming birds of open water are relatively rare as breeders and diving birds still less common, but both kinds are not uncommon during migration periods and winter. Pintails, green-winged and cinnamon teals and Lesser Scaup are some of the ducks most common in migration. Pelicans, phalaropes and several other species of ducks both dabblers and divers are less common.

Shore birds around the edges of ponds and reservoirs are scarce during the breeding season but numerous in migration when little used areas of winter and summer are intensively utilized. Killdeer and spotted sandpiper are sparse summer inhabitants while other sandpipers, plovers and other shore birds become common in migration.

TERRESTRIAL HABITATS

Streamside Forests

Streams of water arising in distant mountains flowing through the desert region contribute underground water to roots of plants growing along the bank. These plants are different from those away from the streambank that have to depend upon rainfall for their water supply. These streamside fringes nearly always contain willows, bushes or heavy brush unless they have been crowded out by larger deciduous trees. A streamside forest is usually dominated by cottonwoods, but sometimes black willows, boxelders or ash trees occur. Cottonwoods are found along the upper portions (in our area) of both Little Colorado and San Juan rivers, and some of the smaller streams of the interior, but are practically missing below Bluff on San Juan and Colorado rivers. Arkansas Kingbirds seem to be more or less limited to the cottonwoods.

Streamside Thickets

Streamside fringes along the Colorado River where the trees are missing vary somewhat from place to place. Just below the mouth of the San Juan, a bar protected from early morning and late afternoon sun by high cliffs on both sides of the river is fringed with willows and covered with scrub oak (*Quercus gambelli*) at an altitude of 3250 feet.

Further down the river at 3200 feet altitude a bar forty-one miles above Lee's Ferry similar to that shown in Figure 3, which was nearly two miles in length and averaged about 100 yards in width, had no beach, but above the vertical bank willows extended inland as much as forty or fifty yards. Between the willows and the sandstone hills in the background, were such bushes as greasewood, squawbush, rabbit brush, arrow weeds, reed canes, tamarix and hackberries. A census by Russell and Woodbury on August 8, 1938, yielded the following: 5 mourning doves, 3 sparrow hawks, 1 ash-throated flycatcher, 3 Say phoebes, 8 Little Traill flycatchers, 2 violet-green swallows, 1 rock wren, 1 canyon wren, 3 shrikes (family?), 17 yellow warblers, 27 yellowthroats, 1 Lucy warbler, 14 chats, 7 house finches, 2 desert sparrows and 6 cliff swallow nests.

Deserts

Inland, away from the streamsides, vegetation varies largely but not entirely with altitude, which in turn is more or less an indicator of precipitation upon which the vegetation depends for water supply. Altitude varies from 3100 feet at Lee's Ferry on Colorado River to about 10,000 feet on the top of Navajo Mountain. Precipitation in the lowlands is usually less than ten or twelve inches.

The lower altitudes from 3100 to 5000 feet bear mainly desert vegetation. The rocky slopes and benches are largely occupied by the black brush, *Coleogyne ramosissima*, which also extends upward and overlaps the lower edges of the pigmy conifers. The desert sparrow seems partial to this type of vegetation.

Valleys and mesa tops with deeper non-saline soil may be potential grassland but much grass has been eliminated by overgrazing and such areas may be dominated by matchweed and Russian Thistle, or if very sandy by *Yucca* and *Ephedra*. Saline soils usually bear stands of shadscale (*Atriplex*) or other saltbushes. Along many of the washes through alkaline soils where underground water can be reached by roots, greasewood (*Sarcobatus*) usually displaces the shadscale.

Of the birds inhabiting these desert areas, perhaps horned larks come nearest to meeting the full force of the desert environment. They generally inhabit the open areas with the lowest vegetation that gives little amelioration from the desert climate. Say's Phoebe is also a common inhabitant of the desert but is not limited to these habitats. It commonly occupies a higher



FIG. 4. AERIAL PHOTOGRAPH SHOWING BLACK MESA IN FOREGROUND, BEYOND WHICH IS KLETHLA VALLEY, CANYONS, MESAS AND NAVAJO MOUNTAIN IN THE DISTANCE: DESERT VEGETATION IN PIGMY CONIFERS ON MESAS INTERSPERSED WITH SAGEBRUSH "TONGUES," CONIFEROUS CAP ON MOUNTAIN. LOOKING NORTH-WEST FROM ARIZONA INTO UTAH.

—Expedition photo. 1937.



FIG. 5. A GIANT TREE OF THE PIGMY CONIFERS. A JUNIPER TREE *Juniperus utahensis* ABOUT 30 FEET IN HEIGHT.

—Expedition Photo.

stratum at the tops of bushes rather than on the ground. The tallest and densest bushes of the desert are usually occupied by mockingbirds and thrashers and the tops of the bushes in a higher stratum by shrikes.

Sagebrush

True sagebrush stands are not very extensive. The deserts below 5000-5200 feet are usually occupied by other cover. Above that altitude, sagebrush tends to take possession of valleys, flats and mesas with deep well drained non-alkaline soil. Hillsides with shallow soils are usually taken by pigmy conifers. Precipitation usually ranges from 10 to 15 inches. The principal bird inhabitants are the Brewer and sage sparrows, which are nearly obligate to this cover.

Pigmy Conifers

Pigmy conifers of junipers and pinyon pines, usually from 10 to 30 feet in height, have a very distinct ecological appearance. They occupy altitudes from about 5000 or 5200 feet up to 7500 feet. The limits vary some on north and south slopes. It is a forest of hillsides and slopes and is consequently seldom solid, being broken by flats and valleys where deeper soils permit other vegetation to take possession. It is especially marked by pockets and tongues of sagebrush. Despite its irregularities, it seems to be more extensive and covers more area than any other single cover type in the Navajo Country.

Rainfall ranges from about ten to fifteen inches per year average, the higher quantities in higher altitudes. The trees grow much closer together and are much more thrifty near the upper than near the lower limit. Maximum size as well as ground cover appear to be reached near the upper ecotone where oaks and ponderosa pines begin to overlap at about 7000 feet. This is probably due to the greater ground moisture supply which allows maintenance of larger crowns in relation to root spread than toward the lower limit where roots occupy much more space than crowns and cause wide spacing of the trees.

Such forests produce nutritious crops of juniper berries and pinyon nuts and the junipers furnish stringy or puffy bark ideal for nest building.

Birds characteristic of this widespread habitat include the following: Permanent residents—Pinyon Jay, Gray Titmouse, Lead-colored Bushtit and Desert Bewick Wren; Breeders—Poor Will, Ash-throated Flycatcher, Gray Flycatcher, Blue-gray Gnatcatcher and Black-throated Gray Warbler.

Other common inhabitants, but not necessarily limited to pigmy conifers, include the following: Permanent residents—Sparrow Hawk, Horned Owl, Flicker, Hairy Woodpecker, Mountain Chickadee, White-breasted Nuthatch and House Finch; Breeders—Mourning Dove, Black-chinned Hummingbird, Cassin Kingbird, Say Phoebe, Mountain and Chestnut-backed Bluebirds, Plumbeous Vireo and Chipping Sparrow.

Shrub Vegetation

In the Navajo Country it is mainly mountains and high mesa tops that rise above the pigmy conifers. Between 7000 and 7500 feet these conifers are rapidly replaced by oaks (*Quercus gambelli*) and other brush or by Ponderosa Pine (*Pinus ponderosa*) or both. While both of these plants tend to occupy the same climatic belt, yet they appear to diverge somewhat, probably on the soil basis, oaks taking the better soils and pines the rockier sites. Rainfall is usually about 16-20 inches. In the higher altitudes of this belt, before it gives way to the spruce-fir forest, there is an intermixture of broad-leaved evergreens of Mountain Laurel (*Ceanothus*) and Manzanita (*Arctostaphylos*) which maintain a winter green.



FIG. 6. GIANT TREE OF THE PIGMY CONIFERS. A PINYON PINE, *Pinus edulis*, ABOUT 30 FEET IN HEIGHT.

—Expedition Photo.

The oaks furnish a summer leafy foliage and fall crops of acorns. The combination of deciduous oaks and the evergreen brush form a chaparral belt which is very conspicuous around the sides of many mountains. The Woodhouse Jay and Spurred Towhee are the most characteristic birds of this chaparral but many other birds invade it without being so much limited in attraction toward it.

Pine Forest

The Ponderosa Pine Forest is a characteristically open type with widely spaced large trees, often with patches of oaks, manzanita or other mountain brush scattered through the openings. It ranges in altitude from about 7000-7500 feet upwards into the spruce-fir forests, where it disappears at about 8000-8500 feet. Patches or stands occur in a few places on high mesa tops (Black Mesa, Defiance Plateau and others) that do not reach into the spruce-fir forests. Grace Warbler and Gray-headed Junco are breeders of the pines and the Rocky Mountain and Black-eared nuthatches seem to be permanent residents.

Spruce-fir Forest

The higher mountains (Navajo, Lukachukai, Tunicha) bear caps of spruce-fir forests on their summits. These are usually mixed with aspens. The total area occupied is relatively small and several species of birds that would normally inhabit such forests appear to be missing—probably because of the small size of the area occupied. Precipitation usually exceeds 20 inches annually and the summer growing season is very short.

This forest seems to be especially attractive to Natalie's Sapsucker, White-breasted Woodpecker, Clark's Nutcracker, Mountain Chickadee, Red-breasted



FIG. 7. NAVAJO MT. LOOKING SOUTHWEST AND SHOWING: CONIFEROUS FOREST CAPS OF SPRUCE-FIR ABOVE, PONDEROSA PINE ON SLOPES, PYGMY CONIFERS ON FOREGROUND RIDGES, CANYON HEADS IN ERODED SIDES.

—Expedition photo. 1937-1-4.

Nuthatch, Townsend Solitaire, Ruby-crowned Kinglet, Audubon Hermit Thrush, Audubon Warbler and Western Tanager, which breed there and some even remain for winter.

Canyon Heads

Irregularities of topography produce many canyon heads that are more or less protected by canyon walls that modify climatic conditions in many sheltered nooks. Such protection is usually in the direction of reduced sunshine which in turn leads to reduced evaporation and allows retention of greater available soil moisture. The net effect of this protection is to bring into these canyon heads vegetation that would normally be found at considerably higher altitudes. It usually consists of mixed vegetation often containing oaks, ponderosa pines and Douglas firs. Such "mixed zones," even though small in area, are attractive to many birds that would normally be associated with similar vegetation at higher altitudes. This sometimes results in strange associations of birds that would normally be otherwise distributed. The Interior Western Flycatcher is a bird that seems to have specialized in this habitat.

Rocks and Cliffs

The irregular topography of the Navajo Country presents enormous quantities of bare cliffs, ledges and rocks. These are practically sterile of food production but yield large returns in shelter from weather and protection from enemies for rock and cliff inhabiting birds. Many cracks and crevices are useful for resting and roosting, high points make ideal lookouts for watchfully waiting birds, and holes, shelves and overhangs make useful nest sites.

Many birds have special niches. Hawks, owls and ravens tend to select inaccessible shelves for nesting sites. Cliff swallows plaster mud nests under overhanging cliffs where they are protected from rain. Canyon wrens inhabit high cliffs and rock wrens smaller rocky outcrops. Say Phoebe and Interior Western Flycatcher both make nests in holes or cavities near the foot of ledges. The White-throated Swift is so adapted to life in cliffs that it never alights on the ground. It both roosts and nests in deep cracks or crevices where it clings with its feet and sails directly out into the air where it garners its food.

Abbreviations

Collectors

- CB—Clarence Birdseye, USBS, 1909.
 CTB—C. Theodore Black.
 LMB—L. Morgan Boyers, RB-MV Expedition, 1933.
 SBB—Seth B. Benson, MVZ, Berkeley, California, 1933.
 CC—Clarence Cottam, U. S. Fish and Wildlife Service, 1927.
 GGC—George G. Cantwell, USBS, 1927.
 LCC—La Mont C. Cole, RB-MV Expedition, 1935-6-7.
 WLD—William Leon Dawson, 1900.
 LAF—Louis A. Fuertes, 1903.
 EAG—E. A. Goldman, U. S. Biological Survey, 1917.
 LG—Ludlow Griscom, Harvard.
 LLH—Llyndon L. Hargrave, MNA, Flagstaff, 1931.
 RJ—Randolf Jenks, 1933.
 CBRK—C. B. R. Kennerly, 1851.
 K & M—Kennerly and Mollhausen.
 WK—William Kiss, RB-MV Expedition, 1935-6-7-8.
 TL—Torrey Lyons, RB-MV Expedition, 1934-5.
 JAL—J. A. Loring, U. S. Biological Survey, 1893.
 CHM—C. Hart Merriam, 1889.
 GM—Gaje Monson, USSCS, 1936-39.
 HBM—H. B. Mollhausen, 1853, 1858.
 EWN—Edward W. Nelson, U. S. Biological Survey, 1909.
 ARP—Allan R. Phillips, MNA, Flagstaff, 1936.
 CPR—C. P. Rowley, AMNH, 1892.
 HNR—Henry N. Russell, Jr., RB-MV Expedition, 1934-5-6-8.
 CPS—C. P. Streater, 1893.
 MPS—Milton P. Skinner, U. S. Biological Survey, 1916.
 JOS—James O. Stevenson, 1934.
 RT—Ralph Teall, RB-MV Expedition.
 WPT—Walter P. Taylor, College Station, Texas, 1931.
 AMW—Angus M. Woodbury, RB-MV Expedition, 1937-38.
 MAW—Milton A. Wetherill.
 W & R—Woodbury and Russell.

Museums

- AMNH—American Museum of Natural History
 BYU—Brigham Young University.
 CU—Cornell University.
 GC—Grand Canyon National Park.
 KU—Kansas University.
 MNA—Museum of Northern Arizona.
 UA—University of Arizona.
 USNM—U. S. National Museum.
 USBS—U. S. Biological Survey.
 UU—University of Utah.

Miscellaneous

- te—testes enlarged
 oe—ovary enlarged

CHECK LIST

R—resident B—breeder M—migrant W—winter C—casual A—accidental

COLYMBIFORMES . . . Grebes

Colymbidae . . . Grebes

Colymbus nigricollis californicus (Heerman).....	CM	Eared Grebe
Podilymbus podiceps podiceps (Linnaeus).....	BM	Pied-billed Grebe

PELECANIFORMES

Pelecanidae . . . Pelicans

Pelecanus erythrorhynchos Gmelin.....	M	White Pelican
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CICONIFORMES . . . Herons, Storks, Ibises, and Allies

Ardeidae . . . Herons and Bitterns

Ardea herodias treganzai Court.....	M	Treganza Blue Heron
Leucophoyx thula brewsteri (Thayer and Bangs)....	M	Brewster Snowy Egret
Nycticorax nycticorax hoactli (Gmelin).....	M	Black-crowned Night Heron
Botaurus lentiginosus lentiginosus (Montagu).....	M	American Bittern
Threskiornithidae . . . Ibises and Spoonbills		
Plegadis guarauna (Linnaeus).....	M	White-faced Glossy Ibis

ANSERIFORMES . . . Swans, Geese, Ducks, Mergansers

Anatidae . . . Swans, Geese and Ducks

Branta canadensis (Linnaeus).....	M	Canada Goose
Chen hyperborea (Pallas).....	CM	Snow Goose
Anas platyrhynchos platyrhynchos Linnaeus.....	BMW	Common Mallard
Anas acuta tztzihoa Vieillot.....	M	American Pintail
Anas carolinensis Gmelin.....	MW	Green-winged Teal
Anas discors Linnaeus.....	CM	Blue-winged Teal
Anas cyanoptera cyanoptera Vieillot.....	M	Cinnamon Teal
Spatula clypeata (Linnaeus).....	CM	Gadwall
Chaulelasmus streperus (Linnaeus).....	M	Baldpate (Widgeon)
Mareca americana (Gmelin).....	M	Shoveller
Nyroca americana (Eyton).....	M	Redhead
Nyroca valisineria (Wilson).....	CMW	Canvas-back
Nyroca affinis (Eyton).....	MW	Lesser Scaup Duck
Charitonetta albeola (Linnaeus).....	CM	Buffle-head
Eristmatura jamaicensis rubida (Wilson).....	MW	Ruddy Duck
Mergus serrator Linnaeus.....	M	Red-breasted Merganser

FALCONIFORMES . . . Hawks, Falcons and Allies

Cathartidae . . . American Vultures

Cathartes aura teter Friedmann.....	B	Western Turkey Vulture
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Accipitridae . . . Hawks, Eagles and Allies

Accipiter gentilis atricapillus (Wilson).....	B	Eastern Goshawk
Accipiter striatus velox (Wilson).....	B	Sharp-shinned Hawk
Accipiter cooperii (Bonaparte).....	B	Cooper Hawk
Buteo jamaicensis calurus Cassin.....	B	Western Red-tailed Hawk
Buteo lineatus elegans Cassin.....	A	Red-bellied Hawk
Buteo swainsoni Bonaparte.....	BM	Swainson Hawk
Buteo regalis (Gray).....	R	Ferruginous Rough-leg
Aquila chrysaetos canadensis (Linnaeus).....	R	Golden Eagle
Haliaeetus leucocephalus (Linnaeus).....	CW	Bald Eagle
Circus cyaneus hudsonius (Linnaeus).....	MW	Marsh Hawk

Falconidae . . . Caracaras and Falcons

Falco mexicanus Schlegel.....	R	Prairie Falcon
Falco peregrinus anatum Bonaparte.....	B	Duck Hawk
Falco columbarius Linnaeus.....	W	Pigeon Hawk
Falco sparverius sparverius Linnaeus.....	R	Eastern Sparrow Hawk

GALLIFORMES . . . Gallinaceous Birds

Tetraonidae . . . Grouse and Ptarmigans

Dendragapus obscurus obscurus (Say).....	R	Dusky Blue Grouse
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Pedicidae . . . Partridges and Quails

Lophortyx gambelii gambelii Gambel.....	R	Gambel Quail
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CHECK LIST Continued

R—resident B—breeder M—migrant W—winter C—casual A—accidental

GRUIFORMES . . . Cranes, Rails and Allies

Perdidae . . . Rails, Gallinules and Coots

<i>Rallus limicola limicola</i> Vieillot	M	Virginia Rail
<i>Porzana carolina</i> Linnaeus	BM	Sora
<i>Fulica americana americana</i> Gmelin	BM	American Coot (Mud Hen)

CHARADRIIFORMES . . . Shore Birds, Gulls, Allies

Charadriidae . . . Plovers, Turnstones and Surf-birds

<i>Charadrius vociferus vociferus</i> Linnaeus	R	Killdeer
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Scolopacidae . . . Woodcock, Snipe and Sandpipers

<i>Numenius americanus americanus</i> Bechstein	M	Long-billed Curlew
<i>Numenius americanus parvus</i> Bishop	CM	Northern Curlew
<i>Tringa flavipes</i> (Gmelin)	M	Lesser Yellow-legs
<i>Tringa melanoleucus</i> (Gmelin)	M	Greater Yellow-legs
<i>Tringa solitaria cinnamomea</i> (Brewster)	M	Western Solitary Sandpiper
<i>Actitis macularia</i> (Linnaeus)	BM	Spotted Sandpiper
<i>Catoptrophorus semipalmatus inornatus</i> (Brewster)	M	Western Willet
<i>Limnodromus griseus scolopaceus</i> (Say)	CM	Long-billed Dowitcher
<i>Capella delicata</i> (Ord)	M	Wilson Snipe
<i>Erolia bairdii</i> (Coues)	M	Baird Sandpiper
<i>Erolia minutilla</i> (Vieillot)	M	Least Sandpiper
<i>Ereunetes mauri</i> Cabanis	M	Western Sandpiper

Recurvirostridae . . . Avocets and Stilts

<i>Recurvirostra americana</i> Gmelin	M	Avocet
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Phalaropodidae . . . Phalaropes

<i>Phalaropus fulicarius</i> (Linnaeus)	A	Red Phalarope
<i>Steganopus tricolor</i> Vieillot	M	Wilson Phalarope
<i>Lobipes lobatus</i> (Linnaeus)	M	Northern Phalarope

Laridae . . . Gulls and Terns

<i>Larus delawarensis</i> Ord	M	Ring-billed Gull
<i>Larus philadelphia</i> (Ord)	CM	Bonaparte Gull
<i>Chlidonias nigra surinamensis</i> (Gmelin)	M	Black Tern

COLUMBIFORMES . . . Pigeon-like Birds

Columbidae . . . Pigeons and Doves

<i>Columba fasciata fasciata</i> Say	B	Band-tailed Pigeon
<i>Zenaidura macroura marginella</i> (Woodhouse)	B	Western Mourning Dove

CUCULIFORMES . . . Cuckoos and Allies

Cuculidae . . . Cuckoos, Roadrunners and Anis

<i>Coccyzus americanus occidentalis</i> Ridgway	CB	California Cuckoo
<i>Geococcyx californianus</i> (Lesson)	R	Road Runner

STRIGIFORMES . . . Owls

Strigidae . . . Typical Owls

<i>Otus asio mycophilus</i> Oberholser	R	Colorado Screech Owl
<i>Otus flammeolus flammeolus</i> (Kaup)	R	Flammulated Screech Owl
<i>Bubo virginianus</i> (Gmelin)	R	Horned Owl
<i>Glaucidium gnoma californicum</i> Sclater	R	California Pigmy Owl
<i>Speotyto cucularia hypugaea</i> (Bonaparte)	B	Western Burrowing Owl
<i>Strix occidentalis lucida</i> (Nelson)	B	Mexican Spotted Owl
<i>Asio otus wilsonianus</i> (Lesson)	R	Long-eared Owl
<i>Asio flammeus flammeus</i> (Pontoppidan)	C	Short-eared Owl

CAPRIMULGIFORMES . . . Goatsuckers and Allies

Caprimulgidae . . . Nighthawks and Poor-wills

<i>Chordeiles minor hesperis</i> Grinnell	M	Pacific Nighthawk
<i>Chordeiles minor henryi</i> Cassin	B	Western Nighthawk
<i>Phalaenoptilus nuttalli nuttalli</i> (Audubon)	B	Nuttall Poor-Will

MICROPODIIFORMES . . . Swifts and Hummingbirds

Micropodidae . . . Swifts

<i>Aeronautes saxatalis saxatalis</i> (Woodhouse)	B	Western White-throated Swift
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Trochilidae . . . Hummingbirds

<i>Archilochus alexandri</i> (Bourcier and Mulsant)	B	Black-chinned Hummingbird
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CHECK LIST Continued

R—resident B—breeder M—migrant W—winter C—casual A—accidental

MICROPODIIFORMES (Continued)

<i>Selasphorus platycercus platycercus</i> (Swainson).....	B	Broad-tailed Hummingbird
<i>Selasphorus rufus</i> (Gmelin).....	M	Rufous Hummingbird
<i>Stellula calliope</i> (Gould).....	M	Calliope Hummingbird

CORACIIFORMES . . . Kingfishers

Alcedinidae . . . Kingfishers		
<i>Megaceryle alcyon caurina</i> (Grinnell).....	M	Western Belted Kingfisher

PICIFORMES . . . Woodpeckers

Picidae . . . Woodpeckers		
<i>Colaptes cafer collaris</i> Vigors.....	R	Red-shafted Flicker
<i>Ceophloeus pileatus picinus</i> (Bangs).....	?	Western Pileated Woodpecker
<i>Balanosphyra formicivora aculeata</i> (Mearns).....	R	Mearns Woodpecker
<i>Asyndesmus lewis</i> Gray.....	R	Lewis Woodpecker
<i>Sphyrapicus varius nuchalis</i> Baird.....	BM	Red-naped Sapsucker
<i>Sphyrapicus thyroideus nataliae</i> (Malherbe).....	B	Natalie Sapsucker
<i>Dryobates villosus leucothorectis</i> Oberholser.....	R	White-breasted Woodpecker
<i>Dryobates pubescens leucurus</i> (Hartlaub).....	R	Batchelder Woodpecker

PASSERIFORMES . . . Perching Birds

Tyrannidae . . . Tyrant Flycatchers		
<i>Tyrannus tyrannus</i> (Linnaeus).....	C	Eastern Kingbird
<i>Tyrannus verticalis</i> Say.....	B	Arkansas Kingbird
<i>Tyrannus vociferans vociferans</i> Swainson.....	B	Cassin Kingbird
<i>Muscivora forficata</i> (Gmelin).....	A	Scissor-tailed Flycatcher
<i>Myiarchus cinerascens cinerascens</i> (Lawrence).....	B	Ash-throated Flycatcher
<i>Sayornis nigricans semiatra</i> (Vigors).....	CR	Northern Black Phoebe
<i>Sayornis saya</i> Bonaparte.....	B	Say Phoebe
<i>Empidonax traillii brewsteri</i> Oberholser.....	B	Little Flycatcher
<i>Empidonax traillii adastus</i> Oberholser.....	M	Warner Valley Traill Flycatcher
<i>Empidonax wrighti</i> Baird.....	B	Wright Flycatcher
<i>Empidonax griseus</i> Brewster.....	B	Gray Flycatcher
<i>Empidonax difficilis hellmayri</i> Brodtkorb.....	B	Interior Western Flycatcher
<i>Myiochanes richardsoni richardsoni</i> (Swainson).....	M	Western Wood Pewee
<i>Nuttallornis mesoleucus</i> (Lichenstein).....	M	Olive-sided Flycatcher

Alaudidae . . . Larks

<i>Otocoris alpestris leucolaema</i> ± <i>occidentalis</i>	R	Desert ± Montezuma Horned Lark
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Hirundinidae . . . Swallows

<i>Tachycineta thalassina lepidia</i> Mearns.....	BM	Violet-green Swallow
<i>Iridoprocne bicolor</i> (Vieillot).....	M	Tree Swallow
<i>Riparia riparia riparia</i> (Linnaeus).....	M	Bank Swallow
<i>Stelgidopteryx ruficollis serripennis</i> (Audubon).....	BM	Rough-winged Swallow
<i>Hirundo rustica erythrogaster</i> (Boddaert).....	M	Barn Swallow
<i>Petrochelidon pyrrhonota albifrons</i> (Rafinesque).....	BM	Northern Cliff Swallow
<i>Petrochelidon pyrrhonota tachina</i> Oberholser.....	?	Lesser Cliff Swallow

Corvidae . . . Jays, Magpies and Crows

<i>Cyanocitta stelleri diademata</i> (Bonaparte).....	R	Long-crested Jay
<i>Aphelocoma californica woodhousei</i> (Baird).....	R	Woodhouse Jay
<i>Pica pica hudsonia</i> (Sabine).....	R?	American Magpie
<i>Corvus corax sinuatus</i> Wagler.....	R	American Raven
<i>Corvus brachyrhynchos hesperis</i> Ridgway.....	?	Western Crow
<i>Gymnorhinus cyanocephalus</i> (Wied).....	R	Pinon Jay
<i>Nucifraga columbiana</i> (Wilson).....	R	Clark Nutcracker

Paridae . . . Titmice, Verdins and Bush-tits

<i>Parus atricapillus nevadensis</i> (Linsdale).....	CW	Pallid Black-capped Chickadee
<i>Parus gambeli gambeli</i> Ridgway.....	R	Mountain Chickadee
<i>Parus inornatus griseus</i> (Ridgway).....	R	Gray Titmouse
<i>Psaltiriparus minimus plumbeus</i> (Baird).....	R	Lead-colored Bush-tit

Sittidae . . . Nuthatches

<i>Sitta carolinensis nelsoni</i> Mearns.....	R	Rocky Mountain Nuthatch
<i>Sitta canadensis canadensis</i> Linnaeus.....	R	Red-breasted Nuthatch
<i>Sitta pygmaea melanotis</i> Van Rossem.....	R	Black-eared Nuthatch

Certhiidae . . . Creepers

<i>Certhia familiaris montana</i> Ridgway.....	R	Rocky Mountain Creeper
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CHECK LIST Continued

R—resident B—breeder M—migrant W—winter C—casual A—accidental

PASSERIFORMES (Continued)

Cinclidae . . . Dippers		
Cinclus mexicanus unicolor Bonaparte	R	Dipper (Water Ouzel)
Troglodytidae . . . Wrens		
Troglodytes aedon parkmanii Audubon	B	Western House Wren
Thryomanes bewicki eremophilus Oberholser	BW	Desert Bewick Wren
Telmatodytes palustris plesius (Oberholser)	M	Western Marsh Wren
Catherpes mexicanus conspersus Ridgway	R	Canyon Wren
Salpinctes obsoletus obsoletus (Say)	BW	Common Rock Wren
Mimidae . . . Mocking Birds and Thrashers		
Mimus polyglottos leucopterus (Vigors)	B	Western Mockingbird
Dumetella carolinensis (Linnaeus)	M?	Catbird
Toxostoma bendirei (Coues)	B	Bendire Thrasher
Oreoscoptes montanus (Townsend)	B	Sage Thrasher
Turdidae . . . Robins, Thrushes, Bluebirds, Solitaires		
Turdus migratorius propinquus Ridgway	R	Western Robin
Hylocichla guttata auduboni (Baird)	B	Audubon Hermit Thrush
Sialia mexicana bairdi Ridgway	R	Chestnut-backed Bluebird
Sialia currucoides (Bechstein)	R	Mountain Bluebird
Myadestes townsendi (Audubon)	BW	Townsend Solitaire
Sylviidae . . . Gnatcatchers and Kinglets		
Poliophtila caerulea amoenissima Grinnell	B	Western Gnatcatcher
Regulus calendula cineraceus Grinnell	BM	Western Ruby-crowned Kinglet
Motacillidae . . . Wagtails and Pipits		
Anthus spinoletta rubescens (Turnstall)	MW	American Pipit
Bombycillidae . . . Waxwings		
Bombycilla cedrorum Vieillot	?	Cedar Waxwing
Ptilogonatidae . . . Silky Flycatchers		
Phainopepla nitens lepida Van Tyne	B	Phainopepla
Laniidae . . . Shrikes		
Lanius excubitor invictus Grinnell	W	Northwestern Shrike
Lanius ludovicianus nevadensis Miller	R	Nevada Shrike
Vireonidae . . . Vireos		
Vireo solitarius plumbeus Coues	B	Plumbeous Vireo
Vireo solitarius cassinii Xantus	M	Cassin Vireo
Vireo gilvus swainsoni Baird	BM	Western Warbling Vireo
Comptosylpidae . . . Wood Warblers		
Vermivora celata (Say)	M	Orange-crowned Warbler
Vermivora ruficapilla ridgwayi Van Rossem	M	Calaveras Warbler
Vermivora virginiae (Baird)	B	Virginia Warbler
Vermivora luciae (Cooper)	B	Lucy Warbler
Dendroica aestiva aestiva (Gmelin)	A	Eastern Yellow Warbler
Dendroica aestiva rubiginosa (Pallas)	A	Alaska Yellow Warbler
Dendroica aestiva brewsteri Grinnell	M	California Yellow Warbler
Dendroica aestiva morcomi Coale	M	Western Yellow Warbler
Dendroica aestiva sonorana Brewster	B	Sonora Yellow Warbler
Dendroica auduboni memorabilis Oberholser	BM	Audubon Warbler
Dendroica nigrescens (Townsend)	B	Black-throated Gray Warbler
Dendroica townsendi (Townsend)	M	Townsend Warbler
Dendroica occidentalis (Townsend)	M	Hermit Warbler
Dendroica graciae graciae Baird	B	Grace Warbler
Seiurus noveboracensis notabilis Ridgway	M	Grinnell Water Thrush
Oporornis tolmiei (Townsend)	M	Macgillivray Warbler
Geothlypis trichas occidentalis Brewster	B	Western Yellow-throat
Icteria virens auricollis (Lichtenstein)	B	Long-tailed Chat
Wilsonia pusilla pileolata (Pallas)	M	Northern Pileolated Warbler
Ploceidae . . . Weaver Finches		
Passer domesticus domesticus (Linnaeus)	R	English Sparrow
Icteridae . . . Meadow Larks, Blackbirds, Orioles, Allies		
Dolichonyx oryzivorus (Linnaeus)	?	Bobolink
Sturnella neglecta Audubon	R	Western Meadowlark
Xanthocephalus xanthocephalus (Bonaparte)	M	Yellow-headed Blackbird
Agelaius phoeniceus utahensis Bishop	BMW	Utah Red-wing
Icterus parisorum Bonaparte	B	Scott Oriole
Icterus bullockii bullockii (Swainson)	B	Bullock Oriole

CHECK LIST Continued

R—resident B—breeder M—migrant W—winter C—casual A—accidental

PASSERIFORMES (Continued)

Euphagus cyanocephalus (Wagler).....	M	Brewer Blackbird
Molothrus ater artemisiae Grinnell.....	B	Nevada Cowbird
Molothrus ater obscurus (Gmelin).....	B	Dwarf Cowbird
Thraupidae . . . Tanagers		
Piranga ludoviciana (Wilson).....	B	Western Tanager
Fringillidae . . . Grosbeaks, Finches, Sparrows, Buntings.		Juncos and Allies
Hedymeles melanocephalus melanocephalus		
(Swainson).....	B	Rocky Mt. Black-headed Grosbeak
Guiraca caerulea interfusa Dwight & Griscom.....	B	Western Blue Grosbeak
Passerina amoena (Say).....	M	Lazuli Bunting
Hesperiphona vespertina brooksi Grinnell.....	M	Western Evening Grosbeak
Carpodacus cassinii Baird.....	BM	Cassin Purple Finch
Carpodacus mexicanus frontalis (Say).....	R	Common House Finch
Spinus pinus pinus (Wilson).....	BW	Northern Pine Siskin
Spinus tristis pallidus Mearns.....	M?	Pale Goldfinch
Spinus psaltria hesperophilus (Oberholser).....	R	Green-backed Goldfinch
Loxia curvirostra bendirei Ridgway.....	M	Bendire Crossbill
Loxia curvirostra grinnelli ± benti Griscom.....	R	Intermountain Crossbill
Loxia curvirostra stricklandi Ridgway.....	M	Mexican Crossbill
Oberholseria chlorura (Audubon).....	M	Green-tailed Towhee
Pipilo maculatus montanus Swarth.....	R	Spurred Towhee
Calamispiza melanocorys Stejneger.....	M	Lark Bunting
Passerculus sandwichensis nevadensis Grinnell.....	B	Nevada Savannah Sparrow
Poocetes gramineus confinis Baird.....	B	Western Vesper Sparrow
Chondestes grammacus strigatus Swainson.....	B	Western Lark Sparrow
Amphispiza bilineata deserticola Ridgway.....	B	Desert Sparrow
Amphispiza belli nevadensis (Ridgway).....	B	Northern Sage Sparrow
Junco hyemalis hyemalis (Linnaeus).....	W	Slate-colored Junco
Junco oreganus shufeldti Coale.....	MW	Shufeldt Junco
Junco oreganus mearnsi Ridgway.....	W	Pink-sided Junco
Junco caniceps caniceps (Woodhouse).....	BM	Gray-headed Junco
Spizella arborea ochracea Brewster.....	W	Western Tree Sparrow
Spizella passerina arizonae Coues.....	B	Western Chipping Sparrow
Spizella breweri breweri Cassin.....	B	Brewer Sparrow
Zonotrichia querula (Nuttall).....	CW	Harris Sparrow
Zonotrichia leucophrys oriantha Oberholser.....	M	Oregon White-crowned Sparrow
Zonotrichia leucophrys gambelii (Nuttall).....	MW	Gambel Sparrow
Melospiza lincolni (Audubon).....	M	Lincoln Sparrow
Melospiza georgiana ericrypta Oberholser.....	A	Western Swamp Sparrow
Melospiza melodia fallax (Baird).....	W	Mountain Song Sparrow
Rhynchophanes mccownii (Laurence).....	W	McCown Longspur
Calcarius ornatus (Townsend).....	W	Chestnut-collared Longspur

HYPOTHETICAL CHECK LIST

P—probable

D—doubtful

Gavia immer elasson Bishop.....	P	Lesser Loon
Pelecanus occidentalis californicus Ridgway.....	P	California Brown Pelican
Ixobrychus exilis hesperis Dickey & Van Rossum.....	P	Western Least Bittern
Anas diazi novimexicana Huber.....	P	New Mexican Duck
Pandion haliaetus carolinensis (Gmelin).....	P	Osprey
Meleagris gallopavo merriami Nelson.....	D	Merriam Turkey
Grus canadensis tabida (Peters).....	D	Sandhill Crane
Cryptoglaux acadica acadica (Gmelin).....	P	Saw-whet Owl
Dryobates scalaris cactophilus Oberholser.....	D	Cactus Woodpecker
Toxostoma dorsale dorsale Henry.....	P	Crissal Thrasher
Hylocichla ustulata almae Oberholser.....	P	Western Olive-backed Thrush
Hylocichla fuscescens salicicola Ridgway.....	P	Willow Thrush
Regulus satrapa apache Jenks.....	P	Arizona Golden-Crowned Kinglet
Vireo vicinior Coues.....	P	Gray Vireo
Vireo olivaceus (Linnaeus).....	P	Red-eyed Vireo
Sturnella magna hoopesi Stone.....	P	Rio Grande Meadowlark
Aimophila ruficeps scotti (Sennett).....	D	Scott Sparrow

SPECIES ACCOUNTS

LESSER LOON . . . *Gavia immer elasson*
(Hypothetical)

Monson (1937:67) reported a Red-throated Loon in the 37th Christmas Census on the basis of a bird observed near Tuba City, Arizona, December 19, 1936. Data from Utah, farther north (A. M. Woodbury) and from Arizona, farther south (Allan R. Phillips) indicate that the form to be expected in migration is *G. i. elasson*, the Lesser Loon.

EARED GREBE . . . *Colymbus nigricollis californicus*

Probably migrant and winter visitant. Merriam (1890:87) reported a bird not certainly of this species at Tanner's Gulch (Pasture Canyon) near Moencopie in late September, 1889. Although cited by Swarth, this is *not* a certain record. Monson observed one on Ganado Lake, August 11, 1938, three on tank near Snake Butte, southwest of Keams Canyon, September 30, 1938, and one on Hopi Reservoir in Pasture Canyon near Tuba City, December 10, 1936.

PIED-BILLED GREBE . . . *Podilymbus podiceps podiceps*

A rare summer resident, probably breeding in the marshes of Pasture Canyon; and migrant known during August and September, stopping at ponds and lakes enroute. **Specimens:** have been taken in the marshes at Pasture Canyon near Tuba City, Arizona, on August 12 and 22, 1938 (UU and MNA). **Observations:** Phillips observed one bird at Tuba City Reservoir and three in Pasture Canyon July 9, 1936; we found it in Pasture Canyon in 1938 on July 21, 22; August 12, 13, 22; and September 7, and at the Tuba City Reservoir September 7. We also found three birds at Cow Springs Lake on August 14 and 15, but they left sometime during the day. They were scarce in July, but were much more common in August and September, presumably in migration. Known only from the Cow Springs Lake and the Tuba City area, 5300 to 5800 feet.

WHITE PELICAN . . . *Pelecanus erythrorhynchos*

A migrant through the region, either irregular or uncommon, going north in April and returning in July or later. **Specimens:** April 19, 1934, Reservoir at Kayenta, Navajo Country, Arizona; 5300 feet; three birds seen, one taken by M. A. Wetherill, bones and tip of right wing saved (MNA). July 28, 1937, 3 miles below Rock Creek on the Colorado River, Utah, shot by Glenny and Cafarella, wings kept by Charles R. Cafarella. **Observations:** October 7, 1926, one observed on Little Colorado River near Winslow (Ludlow Griscom). July, 1934, 5800 feet, Red Lake (Tonalea), Coconino County, Arizona, observed by Bob Thomas, reported by Ralph Teall.

CALIFORNIA BROWN PELICAN . . . *Pelecanus occidentalis californicus*
(Hypothetical)

A sick (?) bird was picked up at Tolani Lakes in early July, 1937, by Mr. Holly Sanders, then of Gallup, New Mexico. It died a few days later. Paul G. Phillips, of Window Rock, Arizona, saw the bird and reported it to Gale Monson.

TREGANZA BLUE HERON . . . *Ardea herodias treganzai*

A regular late summer visitant and migrant, lingering on the rivers, lakes and ponds of the area in migration; possibly remaining to nest occasionally.

Specimens: July 15, 1938, 5500 feet, Kayenta Reservoir, Navajo County, Arizona (UU).

Observations: On San Juan and Colorado Rivers, 3100 to 3500 feet, several singles are reported by Lyons July 5 to 22, 1936; 25 reported by Woodbury and Russell July 30 to August 11, 1938, as many as eight together; one at Lee's Ferry in August, 1909, by E. W. Nelson. On Kayenta Reservoir, 5300 feet, three were seen September 1, 1940, and one November 29-30, 1941, by M. A. Wetherill. At Cow Springs Lake, Woodbury and Russell saw one on July 19, two and three August 14 and 15, and one August 21, 1938. At Red Lake (Tonalea), 5800 feet, Woodbury and Russell saw three on July 19, 1938, and Monson saw one September 13, 1938. On the reservoirs at Tuba City and in Pasture Canyon, 5300 feet, Phillips saw one July 7 and four on July 9, 1936; Monson saw three on August 18, 1937, and Woodbury and Russell reported four from July 20 to 24, one on August 13, and one August 22, 1938; and Monson observed one on December 7, 1936. Skinner saw one at Adamana on October 8, 1916. Monson reported seven at Ganado Lake and one at Oraibi on August 24, 1938, and one at Red Lake north of Fort Defiance on August 29, 1938. Jenks reported three on the Painted Desert (1932:8).

Notes: The only indication of breeding in the area is that recorded by Cooke (1914:403) in which it was reported to E. W. Nelson that two pairs had nested in ponds in Pasture Canyon two miles east of Tuba City. The specimen (UU 4104 ♂ imm.) proved to be of the race *A. h. treganzai*, as would be expected from the location of our area in line of its migration southward from the Great Salt Lake region, the type locality.

BREWSTER EGRET . . . *Leucophoyx thula brewsteri*

A regular though not common migrant, stopping on the rivers, lakes and ponds of the area. **Specimens:** Adult ♀, August 1, 1938, 3375 feet, Bar 17, Mud flats, San Juan River, San Juan County, Utah (UU). Immature ♀, August 1, 1938, 3400 feet, Piute Rapids, San Juan County, Utah (UU 4106).

Observations: May 4, 1937, observed in open desert between Holbrook and Indian Wells, Arizona, by Monson. On the San Juan and Colorado Rivers, 3100 to 3500 feet, Woodbury observed it July 18, 1937, below Forbidding Canyon; two on July 30, 1938, on a bar above mouth of Nokai Canyon, 45 miles up San Juan River; tracks seen in mud of shore of Colorado River, 63-69 miles above Lee's Ferry, on August 4, 1938. Woodbury and Russell reported eleven seen August 1, 1938, on San Juan River, 15-25 miles above Colorado. Woodbury saw two on August 22, 1938, 5400 feet, at Pasture Canyon Reservoir, and Russell one on September 7, 1938, at Tuba City Reservoir, Arizona.

Distribution: Our expeditions have observed it only on the San Juan and Colorado rivers and the Tuba City area, but Gale Monson found one on the open desert obviously out of its habitat.

BLACK CROWNED NIGHT HERON . . . *Nycticorax nycticorax hoactli*

A regular though not common migrant, stopping on the Colorado River and the lakes and ponds of the area, and sometimes in deciduous trees with thick foliage, from July to September, usually one or two at a time. No data

on northward migration. **Specimens:** Immature ♀, July 14, 1934, mouth of Betatakin Canyon, Tsegi drainage, Navajo County, Arizona (MNA); Adult ♀, August 4, 1938, 3230 feet, Bar 64 miles above Lee's Ferry on Colorado River, San Juan County, Utah, Mud Flat (UU).

Observations: Both adults and immature birds have been observed by members of the RB-MV expeditions nine times between July 14 and September 12, of the years 1934-38. On Colorado River, 3100 to 3200 feet, six birds observed in 65 miles, August 4-11, 1938 (W and R). In Tuba City area, 5200 to 5400 feet, four birds seen August 22 to September 7, 1938 (W and R). In Tsegi Canyon, 6300 to 6500 feet, one starving bird captured alive on July 14, 1934, by Wetherill; it died on July 17 (MNA). At Kayenta, 5200 feet, one bird in boxelder trees at Wetherill's Ranch, September 12, 1936 (MAW). On Little Colorado River near Winslow, Arizona, July 11, 29, 1909 (E. W. Nelson).

AMERICAN BITTERN . . . *Botaurus lentiginosus lentiginosus*

Specimens: Female, May 5, 1892, Bluff, San Juan River, Utah (AMNH 57855), probably a migrant.

WESTERN LEAST BITTERN . . . *Ixobrychus exilis hesperis* (Hypothetical)

Probably accidental. One record, flushed from thick weeds by an irrigation ditch in Moencopi Wash below Tuba City, Coconino County, Arizona, by Phillips, July 9, 1936.

WHITE-FACED GLOSSY IBIS . . . *Plegadis guarauna*

A regular migrant, moving southward in flocks in September. **Specimens:** Immature ♀, September 6, 1938, 5300 feet, marsh by road, one mile southeast of Tuba City, Coconino County, Arizona (UU). **Observations:** September 7, 1938, 5400 feet, Pasture Canyon, lower marshes, 21 birds; marsh one mile SE of Tuba City, 8 birds; Tuba City Reservoir, one seen (HNR). **Notes:** Specimens reported by Woodhouse (1853:98) were taken about October 2, 1851, on the Little Colorado River near the mouth of Chevelon's Fork, NW of Winslow, Arizona (ARP). Two flocks and a single were seen by Russell near Tuba City, September 6, 7, 1938.

CANADA GOOSE . . . *Branta canadensis*

A regular migrant in late September and October, sometimes stopping on ponds and lakes. **Observations:** September 22, 1934, Betatakin Canyon. "The largest flock seen in several years" (MAW). October 7, 1936, Tonalea (Red Lake), Arizona, flock of ten seen (MAW). Hargrave (1939:207) reports part of a skeleton taken from Poncho House ruins in San Juan County, Utah, probably buried between 700 and 1300 A.D., and J. O. Brew (letter) reports bones from Awatovi ruins probably deposited between 1400 and 1600 A.D.

SNOW GOOSE . . . *Chen hyperborea*

Casual migrant. **Specimens:** Immature ♂, October 15, 1941, reservoir two miles west of Kayenta; one other seen by M. A. Wetherill (MNA). **Other Records:** Hopi Indian reports (Hargrave, 1939:207) of flocks on desert ponds of Little Colorado River Valley before 1908 and especially in

1903 or 1904 at Red Lake on lower Polacca Wash north of Leupp; large flock seen in first half of October, 1928, in White Cone Valley (Hargrave, *loc. cit.*). Dr. Parry Reiche reports a flock of about 80 white geese about three miles east of Red Lake Trading Post on Polacca Wash in October a few years before.

COMMON MALLARD . . . *Anas platyrhynchos platyrhynchos*

A rare breeder, regular migrant and not uncommon winter resident. **Specimens:** June 25, 1927, Wheatfield Creek, west side of Tunicha Mountains, 7000 feet. **Observations:** One lone ♀ and two half-grown flightless young (remnant of a brood) in shallow water and rushes at reservoir three miles west of Kayenta, July 13-15, 1938 (AMW and HNR). Wetherill records it "nesting" at the same place in 1936 and 1937. Merriam (1890:87) found a large number on a pond in Tanber's Gulch (Pasture Canyon) near Moencopi, September 23, 1889. We saw occasional mallards mixed with large flocks of pintails at Cow Springs Lake during mid-August. Russell found them coming in small flocks (5-9) in the Tuba City area on September 6 and 7, 1938. Gale Monson has records from Tuba City vicinity; 47 on December 8, 1936; 5 on December 9, 1937; 11 on January 22, 1937; one each on January 25, 26, 1937; 19 on February 19, 1937, and from Ganado Lake; 2 on August 11, 1938, and 4 on December 14, 1938; from Red Lake north of Ft. Defiance, 3 on August 29, 2 on September 30 and 2 on November 4, 1938; and from Kayenta, 10 on April 9, 1937. Milton Wetherill observed about 100 on the reservoir near Kayenta November 29-30, 1941.

NEW MEXICAN DUCK . . . *Anas diazi novimexicana*
(Hypothetical)

About September 1, 1931, Hargrave flushed five or six ducks from a marsh on the SW side of Little Colorado River at sunrise, a short distance east of Winslow, Arizona, which he identified as this species.

AMERICAN PINTAIL . . . *Anas acuta tzitzihua*

Abundant regular spring and late summer migrant lingering at the open lakes and ponds along the way, mostly in large flocks during the peak of migration. **Specimens:** Adult ♀ ♀, August 14, 1938, 5800 feet, pond near Red Lake (Tonalea), Coconino County, Arizona (UU).

Observations: The 28 recorded observations of pintails in our area appear to fall in two groups representing spring and fall migrations. Six records of flocks ranging in size from four to sixty occur between February 7 and April 9, while the balance of 22 records ranging in number from one to 3000 fall between July 7 and September 30. Skinner (USBS) records a flock of 38 at Jacob's Well, east of Navajo, Apache County, Arizona (near our area), on October 5, 1916. The peak of the fall migration appears to be reached in middle or late August, tapering off in both directions. During the peak of migration all of the open ponds, tanks and lakes are probably utilized all over the area as resting and feeding places along the way. Some may remain for winter. Milton Wetherill reports about 150 near Kayenta November 29-30, 1941, which presumably remained until December 20. Scattered individuals have been observed by us in July and early August on the San Juan River, Cow Springs Lake, Red Lake (Tonalea), and the ponds near Kayenta and Tuba City. Monson records a single individual near White Cone Trading Post on July 7, 1937, and has additional records from

Ganado Lake, Joseph City, Rough Rock Trading Post, and near Snake Butte SW of Keams Canyon.

GREEN-WINGED TEAL . . . *Anas carolinensis*

Regular migrant and winter resident; common on the ponds and lakes during April as well as late August and early September, some remaining for winter. **Specimens:** Adult ♂, August 16, 1934, 6200 feet, Tsegi Canyon, three miles below Betatarkin in Navajo County, Arizona; from flock of eight on stream (MNA). August 17, 1937, 3200 feet, Colorado River between Rock Creek and Lee's Ferry (UU).

Observations: Of the 28 records of observations available to us, none of them occur in either June or July, but nearly every other month is represented. The numbers, however, are small, ranging from one to 16 except during August, when they reach 45 and 75 in two flocks, April when 350 were seen, and November-December when 200 were observed. They are widely scattered over nearly all the ponds and streams in the area, including such places as San Juan River, Kayenta Reservoir, Cow Springs Lake, Red Lake (Tonalea), Tuba City waters, Red Lake north of Fort Defiance, Ganado Lake, Pine Springs and tanks or ponds near Holbrook, Leupp, Bodaway House, Gap Trading Post, Frazer Trading Post, Round Rock Trading Post, Kaibito, Keams Canyon and St. Michaels.

BLUE-WINGED TEAL . . . *Anas discors*

A sparse migrant in May, presumably also in fall. **Specimens:** Adult ♂, May 10, 1933, near Bluff, Utah (UU); Merriam (1890:87) reported taking a specimen and seeing several others on a pond north of Moencopie (Pasture Canyon) September 23, 1889. Phillips thinks these may be eclipse-plumaged *A. cyanoptera*.

Notes: We have the following observations of Spring-plumaged birds which appear satisfactory: May 4, 1937, one ♂ on lake between Joseph City and Holbrook (ARP); May 13, 1937, one ♂, two ♀ on stock tank on Wildcat Mesa, NW of Keams Canyon (GM); May 18, 1937, a pair on stock tank near Snake Butte SE of Keams Canyon (GM). These seem sufficient to warrant inclusion of the bird in the list as a spring migrant, but several fall records are not included here because of the uncertainty of distinguishing fall-plumaged birds from the much more numerous Cinnamon Teal in migration about the same time.

CINNAMON TEAL . . . *Anas cyanoptera cyanoptera*

A summer straggler and a common spring and late summer migrant, stopping on the rivers and lakes in the area, lingering until late fall. **Specimens:** ♂, May 18, 1892, Bluff, San Juan River, Utah (AMNH). Adult ♀, August 11, 1938, 3100 feet, Colorado River at Paria Creek, Coconino County, Arizona (UU). Immature ♂ and two adult ♀, August 12, 1938, 5400 feet in marshes and cattails, Pasture Canyon near Tuba City, Coconino County, Arizona (UU). September 7, 1938, 5300 feet, Tuba City Reservoir, Coconino County Arizona. Head only, found by side of reservoir—bill length: 47.5 (UU).

Observations: Out of 30-40 records of observations, several are spring records between March and May 26. The balance are late summer, fall and winter records. While it is possible that there may have been scattering blue-

winged teals not accurately identified among the records, yet it seems certain that the great majority must have been cinnamon teal. Both adult and immature birds were in the flocks stopping on the ponds and lakes in southward migration. Stragglers (possibly breeders) were observed at Tuba City waters July 9, 1936, by Phillips, and July 21, 1938, by Woodbury and Russell. One bird only was reported from the Colorado River, August 5, 1938, but twelve were seen August 11, 1938, near Lee's Ferry. Flocks in southward migration have been observed from August 11 to September 7 with a questionable record in November. These flock observations include: Tuba City area, 15 birds August 2 and 13, 1938, 19 on August 21, 23 on August 22, 20 on September 6, and 4 flocks of 21, 25, 18 and 20 on September 7; Cow Springs Lake and pond nearby, 150 and 50 on August 14, 35 on August 15, 14 on August 21; Kayenta area, 14 on August 19, 1938, 8 on August 20, 1936. Phillips found them common on the lake between Joseph City and Holbrook, Arizona, May 4, 1937. Monson has several spring, fall and winter records scattered well over the area, of which the largest number of 200 comes from Kayenta, April 9, 1937. M. P. Skinner of the U. S. Biological Survey has three records of small flocks in September and October, 1916.

SHOVELLER . . . *Spatula clypeata*

An uncommon migrant, possibly a casual summer resident. Observations mostly of small flocks or stragglers in flocks of other ducks. **Specimens:** Merriam (1890:87) reported taking a duck of this species from a flock circling over his campfire in Tanner's Gulch (Pasture Canyon) on the evening of September 23, 1889.

Observations: February 7, 1938, Joseph City, Arizona, four birds (GM); March 24, 1934, Kayenta, Navajo County, several seen on reservoir (LH); April 9, 1937, Kayenta, flock of 20 (GM); May 27, 1937, near Blue Point south of Oraibi, one ♂ (GM); June 23, 1938, Red Lake north of Fort Defiance, four birds (GM); August 14, 1938, 5800 feet, Cow Springs Lake, two seen (AMW); September 7, 1938, 5400 feet, Pasture Canyon, lower marshes, 7 observed; marshes near road one mile SE of Tuba City, 5 seen; Tuba City Reservoir, 2 seen (HNR); October 5, 1936, Red Lake north of Fort Defiance, 12 seen (GM); October 13, 1938, stock tank near Snake Butte SW of Keams Canyon, 6 observed (GM); November 7, 1938, one dead in road near Cross Canyon Trading Post east of Ganado (GM); November 29-30, 1941, Kayenta Reservoir, about 100 which presumably remained at least until December 20 (MAW).

GADWALL . . . *Chaulelasmus streperus*

Migrant. Phillips reported one in lower Pasture Canyon near Tuba City, July 9, 1936, that "flushed repeatedly—would not leave." Monson reports two near Frazer Trading Post, north of Chin Lee, April 21, 1938; one pair on stock tank on Wildcat Mesa, NW of Keams Canyon, May 13, 1937; three on stock tank near Snake Butte, SW of Keams Canyon, October 13, 1938.

BALDPATE (WIDGEON) . . . *Mareca americana*

A spring and fall migrant and probably a sparse winter resident. **Specimens:** Adult ♀, August 12, 1938, 5400 feet, ponds in Pasture Canyon, Tuba City, Coconino County, Arizona (UU).

Observations: March 25, 1937, four on Hopi Reservoir (Pasture Canyon) (GM); April 19, 1937, 40 near Kayenta (GM); May 13, 14, 1937,

one and nine respectively on stock tank on Wildcat Mesa northwest of Keams Canyon (GM); July 19, 1938, 5400 feet, Cow Springs Lake, one male seen (W and R); August 12, 1938, 5400 feet, Pasture Canyon and vicinity, two seen, one taken (W and R); August 14, 1938, 5800 feet, on pond between Cow Springs Lake and Red Lake, one seen (W and R); September 30, October 13, 1938, one and four respectively on stock tank near Snake Butte, SW of Keams Canyon, Arizona (GM); October 6, 1936, sixteen near St. Michaels, Arizona (GM); November 29-30, 1941, about twenty near Kayenta, presumably remaining until December 20 (MAW); December 15, 1938, ten at Tuba City (H. C. Lockett).

The Baldpate is probably not a breeder, but it doubtless occurs in small numbers through most of the year. The ♂ observed in July did not appear to be breeding.

REDHEAD . . . *Nyroca americana*

Several were seen on the reservoir near Kayenta, Navajo County, Arizona, March 23, 1934 (L.L.H.).

CANVAS-BACK . . . *Nyroca valisineria*

A sparse migrant and winter visitant. **Observations:** February 7, 1938, Joseph City, four birds (GM); February 10, 1938, Ganado Lake, two seen (GM); April 9, 1937, Kayenta, 4 observed (GM); November 15, 1935, Kayenta, several seen (MAW); December 2, 1941, Kayenta reservoir, 10 seen (MAW).

LESSER SCAUP DUCK . . . *Nyroca affinis*

Migrant and summer straggler. **Specimens:** Adult ♀ July 8, 1938, 6600 feet, Little Man's Lake, 10 miles SW Marsh Pass, sagebrush flat, Navajo County, Arizona (UU); Adult ♀, July 19, 1938, 5800 feet, Cow Springs Lake, Coconino County, Arizona (UU).

Observations: March 18, 1931, lake near Holbrook, about a dozen (LLH); February 10, 1938, 4 at Ganado Lake (GM); April 9, 1937, 130 at Kayenta (GM); June 7, 1937, one ♂ near Padilla Mesa, southwest of Oraibi (GM); one a day average between June 11 and July 22, 1936, on Colorado River (Lyons); July 8, 1938, Little Man's Lake, 10 miles southwest of Marsh Pass, Arizona, two pairs observed, one ♀ taken (HNR); July 19, 1938, 5800 feet, Cow Springs Lake, Coconino County, Arizona, two in company with Ruddy Duck and Red Phalarope (W and R); July 20, 1938, 5800 feet, Red Lake (Tonalea), Coconino County, Arizona, 2 seen (W and R); July 21, 1938, 5300 feet, Pasture Canyon Reservoir, two seen (AMW); November 4, 1938, Red Lake (N of Fort Defiance), 23 in flock (GM).

Notes: The meager data seem to indicate that the bird is not only a migrant and winter visitant, but also that a few stragglers attempt to summer on the ponds of the area.

BUFFLE-HEAD . . . *Charitonetta albeola*

M. A. Wetherill observed on the Kayenta Reservoir, Navajo County, Arizona, several on November 15, 1935, and about 200 November 29-30, 1941, which presumably remained among the 1000-1500 ducks there through December 20.

RUDDY DUCK . . . *Erismatura jamaicensis rubida*

Probably a migrant and winter visitant. **Specimen:** Adult ♀, July 19, 1938, 5800 feet, Cow Springs Lake, Coconino County, Arizona (UU). **Observations:** February 10, 1938, 2 on Ganado Lake (GM); March to April, 1936-37, seen on Kayenta marshes (MAW); April 9, 1937, Kayenta, ten seen (GM); August 29, 1938, Red Lake north of Fort Defiance, five observed (GM); September 28, 1916, tank in open desert south of Fort Defiance, six noted (M. P. Skinner); November 29-30, 1941, Kayenta reservoir, about 250, presumably remaining with other ducks through December 20 (MAW).

RED-BREASTED MERGANSER . . . *Mergus serrator*

Sparse migrant. **Specimen:** Adult ♀, taken November 7, 1935, 5300 feet, Kayenta Reservoir, by M. A. Wetherill (MNA). **Observation:** by Wetherill on November 15, 1935, at Kayenta Reservoir, a pair of birds believed to be of this species; a reference in the reports of one of the Colorado River trips to a merganser killed and eaten by the party. Time and date unknown.

WESTERN TURKEY VULTURE . . . *Cathartes aura teter*

A common summer resident almost everywhere in the area. **Specimens:** Adult ♀, May 11, 1933, near Bluff, Utah, from large flock in cottonwood tree (UU); adult ♀, August 3, 1934, 6700 feet, Dogoszhi Biko, Navajo County, Arizona (MNA); adult ♂, July 26, 1936, pigmy conifers, two miles north of Navajo Mountain Trading Post, San Juan County, Utah (GC); adult ♀, August 8, 1936, 500 feet, pigmy conifers, Navajo Mountain, San Juan County, Utah (GC).

Observations: Vultures have been observed in April (13, 15) by Wetherill, and by others nearly every day from June (6/1/35) to mid-September (9/15/34) over a period of years. They have been seen at Pasture Canyon (near Tuba City), Red Lake (Tonalea), near Lee's Ferry on Colorado River, Coconino County, Arizona; near Cow Springs Lake, Klethla Valley, near Little Man's Lake, Shonto Canyon, Sand Valley, Long-house Valley, Marsh Pass, Tsegi Canyons (Water Lily, Betatakin, Dogoszhi Biko, Long Canyon), Black Mesa, Skeleton Mesa, Kayenta area, Monument Valley (Comb Ridge), Keam's Canyon (Fisher 1903:34), Navajo County, Arizona; Navajo Mountain (East foot, Soldier Seep, War God Spring, Trading Post, Beaver Creek), San Juan and Colorado Rivers, San Juan County, Utah; and Kaiparowits Plateau, Kane County, Utah. These are mostly in the lower altitudes over the valleys, canyons and mesas from 3100 to 8000 feet. Monson's earliest records are one bird at Cross Canyon Trading Post east of Ganado March 28, 1938, and five at Kaibito April 15, 1937. His latest record is a bird at a sawmill in Transition zone northwest of Fort Defiance October 1, 1936. However, he believes most of the birds go south about September 15 to 20, and a few may linger in the valleys beyond October 1.

Classification: The measurements of our specimens indicate that they belong to the small race, *C. a. teter*. The wings measure from 485 to 500 mm. and the tail from 254 to 261 mm.

Remarks: This conspicuous bird is seldom missed in observations and hence the number of observations in both time and space seems to over-emphasize its occurrence by comparison with less conspicuous birds. The unfeathered small head and great wing expanse make its identification almost

certain. It is nearly always observed singly, although occasional records indicate that 2, 3, 4 or 5 have been seen together, and Milton Wetherill records that he saw "19 circling over the rim" of Betatakin. Russell records finding on August 17, 1936, a roost harboring about thirty birds high up in the cliffs in Comb Ridge about 20 miles east of Kayenta, Arizona, where the birds settled for the night and sought shelter by day from occasional thunderstorms. Fisher (1903:34) reported about fifty roosting in a clump of dead pinyons near Keam's Canyon in late July, 1894. Woodbury observed a large flock in a cottonwood tree near Bluff, May 11, 1933. While no breeding data have been accumulated, it is believed that breeding takes place in the canyons before our parties reach the field.

EASTERN GOSHAWK . . . *Accipiter gentilis atricapillus*

The meager observations of this species seem insufficient to establish its status, although its occurrence in June and July suggests that it may be a sparse summer resident which probably breeds on mesas and mountains.

Observations: May 30, 1937, adult ♂ observed in aspens and deciduous thickets near head of Tabiko (LH et al); June 27, 1933, Kiet Siel Springs, Skeleton Mesa, adult ♀ noted (LH); July 15, 1936, Tsegi Canyons, one seen in Dogoszhi Biko about one mile below mouth of Water Lily Canyon; in tree on canyon wall (LH); July 23, 1936, observed at War God Spring, Navajo Mountain, San Juan County, Utah; one single female bird, well seen (HNR); October 1, 1936, one adult at Sawmill, Transition Zone (GM); October 7, 1936, one observed near St. Michaels, Transition Zone (GM).

SHARP-SHINNED HAWK . . . *Accipiter striatus velox*

Breeding summer resident arriving in mid-April and remaining at least until the end of September, nesting in heads of canyons in heavy timber or chaparral, locally common in the breeding season but more widely distributed in migration; probably a sparse winter resident.

Specimens: Adult ♀, May 1, 1936, 6800 feet, Betatakin Canyon, Tsegi Drainage, Navajo County, Arizona (MAW); Adult ♀, June 24, 1936, 6500 feet, pigmy conifers, two miles NW of Marsh Pass, Tsegi Drainage, Navajo County, Arizona (UU); Adult ♀, July 24, 1935, 6900 feet, Douglas firs, Lower Long Canyon, Tsegi Drainage, Navajo County, Arizona (UU); ♂, July 13, 1933, 9000 feet, Transition Zone, Soldier Spring, Navajo Mountain, San Juan County, Utah (MVZ); ♂, July 30, 1937, 7000 feet, pigmy conifers, Kaiparowits Plateau, Kane County, Utah (UU); Immature ♂ ♂ and ♀, August 5 and 6, 1937, 7000 feet, aspen and chaparral, Kaiparowits Plateau, Kane County, Utah (UU); Immature ♂, August 13, 1934, 7200 feet, pigmy forest, Dogoszhi Biko, Tsegi drainage, Navajo County, Arizona (MNA).

Observations: Observations by members of our expeditions have been recorded every month from April (9/19/36, 4/24/35) to October (10/25/36, 10/20/35) and in the following locations: Tsegi drainage (Betatakin, Kiet Siel, Water Lily and Dogoszhi canyons), Black Mesa (slopes above Marsh Pass), Navajo County, Arizona; Navajo Mountain (War God and Soldier Springs, Beaver Creek Canyon), San Juan County, Utah, and on Kaiparowits Plateau, Kane County, Utah, at altitudes 6500 to 9000 feet and always in wooded country. Monson (1937a:67) reported one at Tuba City, December 19, 1936. Loring reported one near Bluff, Utah, November 9, 1893. Other records (Skinner, Goldman, Monson and Wetherill) indicate that it has been observed near Chin Lee, near Ganado, near Keams Canyon, near Moencopi, on

White Mesa, along the Little Colorado River, and Sand Valley. Hargrave (1939:207) reports part of a skeleton from ruins of Kiet Siel Pueblo. Tsegi drainage, probably buried between 700 and 1300 A.D.

Breeding Notes: Monson flushed a female from a nest 15 feet up in a pinyon pine on Bahlakai Mesa, June 29, 1937. The nest contained four eggs one of them hatching. A small compact nest made of small twigs was discovered by Russell, July 24, 1935, in a small steep cove in lower Long Canyon, 25 feet up in one of a small group of Douglas firs. It contained three young birds ready to fly, and was vigorously defended by both parents, which dived within a few inches of the intruder's head (UU 4121, 4122). Young birds out of the nest attended by parents were observed by Woodbury in the head of a small box canyon containing tall maples and oaks near Pleasant Grove, Kaiparowits Plateau, August 5 and 6, 1937. The young birds probably leave the nest about the first of August and are widely scattered in September. Wetherill reported a pair that summered in Betatakin for several years.

COOPER HAWK . . . *Accipiter cooperii*

A common breeder of the mesa tops and canyon heads. **Specimens:** Two ♂, April 31 and May 1, 1892, Riverview, San Juan River, Utah (AMNH). Adult ♂, June 29, 1936, 6800 feet, Betatakin Canyon (MAW). Immature ♂, July 25, 1936, 6500 feet, pigmy forest, near Navajo Mountain Trading Post, San Juan County, Utah (UU). Juvenile ♀ and ♂, August 5, 1937, 7000 feet, aspen and chaparral, Kaiparowits Plateau (UU). Immature ♂, August 9, 1935, 8500 feet, ponderosa pine, SW side of Navajo Mountain, San Juan County, Utah (GC).

Observations: The Cooper Hawk has been observed from mid-June (18, 27, 29) to October 2, but these observations probably do not cover its complete period of residence. It has been seen at several places in the Tsegi drainage (Betatakin, Long Canyon, Bubbling Springs Mesa), on Black mesa, near Cow Springs Lake and Tuba City (probably in migration), all in Arizona. Also on Kaiparowits Plateau, Kane County, Sand Valley and Navajo Mountain, San Juan County, Utah; Monson has reported it from Ganado and St. Michaels. Nearly all records are from heavily wooded country.

Breeding: Vigorous hunger calls of a young hawk just able to fly led Woodbury August 5, 1937, to a Cooper Hawk nest (30x35x24 in.) about 40-50 feet up in an aspen grove near the head of Pleasant Grove Canyon on Kaiparowits Plateau. The nest contained in addition to one juvenile, one unhatched egg, a chipmunk tail, feathers of pinon jays and spurred towhees, and unidentified feathers and bones of other birds. The parents both came to the nest while it was being watched. An adult taken in the brush nearby at an eating perch had been feeding upon a rabbit and a juvenile sharp-shinned hawk. This was at a time when young sharp-shinned hawks out of nest were being tended by parents in the next canyon head containing maples and oaks a mile or two south of the one occupied by the Cooper hawks. Woodbury and Russell saw a large female in the trees on the outskirts of Tuba City on August 21, 1938. Next day Woodbury observed what was believed to be the same bird at a shallow pond a mile or two SE of Tuba City. There were some shorebirds about, but the hawk paid no attention to them and went wading in the shallow water as if hunting for food. Hargrave reports seeing a nest in a cottonwood at Jeddito in July, 1929, that contained not only the living young but also some mummies that had apparently been shot the previous summer (1928).

WESTERN RED-TAILED HAWK . . . *Buteo jamaicensis calurus*

A common permanent resident widely distributed over the area. **Specimens:** ♀, April 22, 1892, Noland's Ranch, near 4-corners, San Juan River, Utah (AMNH); two immature ♂♂, July 7, 1936, 3250 feet, mouth of Bridge Canyon, San Juan County, Utah (GC); immature skeleton, July 25, 1934, mouth of Tsegi Canyon, Navajo County, Arizona (MNA); adult skeleton, August 2, 1934 Kiet Siel Canyon, Tsegi drainage, Navajo County, Arizona (MNA); Immature ♀, August 9, 1934, Tsegi Canyon, Navajo County, Arizona (MNA); Hargrave (1939:207) reports part of a skeleton taken from Awatovi ruins, near Jeddito, probably deposited before 1700 A.D.

Observations: It has been observed in numerous places: Tuba City region (City reservoir, Pasture Canyon), Red Lake (Tonalea), Cow Springs, Shonto Canyon, Tsegi (Betatakin, Kiet Siel, Dogoszhi, Water Lily, Long canyons), Black Mesa, Marsh Pass, Kayenta, Monument Valley (Totempole, Gypsum Creek, Slim Rock), Keam's Canyon (Fisher 1903:35), Arizona; Goulding's Post, Navajo Mountain (Beaver Creek, War God Spring, Soldier Seep), Kaiparowits Plateau, Utah. Monson reports seeing it every month over much of the Navajo reservation in Upper Sonoran Zone. Loring (November 8-15, 1893) remarked that they were frequently seen along the bluffs along the San Juan River in search of cottontails and spermophiles.

Breeding Notes: A very common breeding bird nesting almost exclusively among the cliffs, usually in inaccessible places, high up on cliff faces. Monson reports finding a nest containing three eggs nearly ready to hatch on Mormon Ridges April 21, 1937, and a nest containing half-grown young in top of a Douglas fir in a canyon on Bahlakai Mesa on June 14, 1937. Russell reports parents carrying rock squirrels, chipmunks and occasionally snakes to the young. He found young still in the nest on June 30. Hargrave reported a pair June 21 with nest in a cliff, but did not see young. Woodbury found a freshly used nest July 4 from which the young had recently departed.

RED-BELLIED HAWK . . . *Buteo lineatus elegans*

A very rare bird, probably accidental now in the Navajo Country. Kennerly and Molhausen took a specimen on the Little Colorado River at the mouth of Leroux Wash, two miles west of Holbrook, December 5, 1853. Although Swarth (Pac. Coast Avif. 10:84) has questioned this record, Phillips has come to the conclusion (letter) that it is valid. He maintains that it was identified by a competent ornithologist (Cassin) and that its loss should not alter its standing. A single record is available since that time in this area. It was observed December 7 to 11, 1937, just east of Kayenta by Milton and Hosteen John Wetherill and by Hargrave, who failed in a special attempt to take it for a specimen. While these are the only known records of recent times, bones belonging to this species (identified by Glover Allen) have been excavated from the Awatovi ruins by the Harvard University Peabody Museum expedition. J. O. Brew (letter) places the date of deposition between 1400 and 1600 A.D.

SWAINSON HAWK . . . *Buteo swainsoni*

Migrant and sparse breeder in cottonwoods. **Specimens:** Two adults, July 20, 1909, between Winslow and Lupton (USNM); immature ♂, April 29, 1935, near Bluff, Utah (UU).

Observations: May 13, 1937, on Wildcat Mesa, three seen separately (GM); May 20, 1937, north of Oraibi, one observed (GM); June 29, 1937,

near Bahlakai Mesa, one seen (GM); July 8, 1936, Moencopi Wash below Tuba City, adult in normal plumage seen on fence-post; July 11-29, 1909, one near Holbrook, two near Carrizo (EWN); July 14, 30 and 31, 1937, one each day in Hopi Buttes (GM); August 13, 1938, four near Chin Lee (GM); August 15, 1938, 5800 feet, Cow Springs Lake, two birds seen at close range on fence-posts, probably a pair, hunting together (AMW); August 25, 1937, near Montezuma Chair, NE of Leupp (GM); September 7, 1938, 5400 feet, Pasture Canyon, lower marshes, one bird, well seen at close range—very sleepy after a meal on a rabbit (HNR).

Breeding Notes: Monson found a relatively small nest of cottonwood twigs in a cottonwood tree on Polacca Wash near Toreva containing one fresh egg on May 7, 1937. Bird on nest much darker than mate which was "normal" phase. Nelson and Birdseye found a nest containing two nearly grown young 40 feet up in a cottonwood on July 19 and one containing two downy young 30 feet up in a cottonwood on July 20, 1909, both of them along the Little Colorado River near Winslow.

FERRUGINOUS ROUGH-LEG . . . *Buteo regalis*

Permanent resident of the Navajo Country. **Observations:** Despite the lack of specimens, it seems justifiable to include this bird on the basis of many observations from various sources. Black reported one near Tonalea, August 16, 1930. Hargrave found birds apparently breeding near Marsh Pass in 1936. Monson has over 40 records well scattered through all the months of the year except November. Stevenson reported seeing one four miles south of Oraibi, July 29, 1934. Phillips observed one at the lake in Lower Pasture Canyon near Tuba City, July 9, 1936.

Distribution: Birds have been observed in many places widely distributed through the Navajo Country. Localities include Oraibi, Frazer Trading Post, Shinumo Altar, Gap Trading Post, Bodaway House, Kaibito, Wildcat Mesa, Polacca, Snake Butte, Hotevilla, Rough Rock Trading Post, Steamboat, Tuba City, Tonalea, Keams Canyon, Window Rock and Holbrook. Dates are distributed through nearly every month of the year and there is no apparent seasonal variation in numbers.

GOLDEN EAGLE . . . *Aquila chrysaetos canadensis*

Probably a sparse breeding resident with large territory. **Specimens:** July, 1934, Dogoszhi, Tsegi Canyon, Navajo County, Arizona, old skeleton and feathers (dead at least several months); compared with known material at MNA and Los Angeles Museum (MNA).

Observations: Fisher (1903:34) reports that on his trip to Keams Canyon, July 17 to August 3, 1894, as many as a dozen captive birds were counted at Moki pueblos, where they were used in certain ceremonies. Nelson and Birdseye observed one five miles below Winslow on the Little Colorado River, July 19, and one at Walpi, August 10 or 11, 1909. Skinner saw one on mesa east of Adamana, October 6, 1916. Goldman reported two on the canyon of the Little Colorado River between Winona and Moencopie Wash, July 31; saw one near mouth of Canyon del Muerto, August 18, and another near Roof Butte, August 23, 1917. Monson has over 20 records of observations in the years 1936 to 1939 distributed through every month of the year except September and October at the following places: Rough Rock Trading Post near Navajo, near Adamana, at Leupp, Hopi Buttes, Window Rock,

Preston Mesa north of Tuba City, White Mesa southeast of Kaibito, Glen Canyon on Colorado River, near Oraibi, near Toreva, near Steamboat, near Polacca, Square Butte west of Inscription House, Tonalea (Red Lake), and near Tuba City. A dozen records of observations by members of our expeditions are distributed between July 8 and August 15 in the years 1935 and 1938 at the following locations: Monument Valley (Gypsum Wash and Gouldings Trading Post); Navajo Mountain, Utah; Tsegi Canyons (Dogoszhi Biko and Water Lily), Arizona; Marsh Pass and Kayenta area, where an eagle flying over the valley was heckled first by a pair of Cassin Kingbirds and then by a Sparrow Hawk. Phillips saw one 10 miles east of Moencopie July 5, 1936. Hargrave saw one six miles south of Tonalea, March 22, 1934, and one on the Little Colorado River far below Cameron, December 7, 1930. Jenks reported one a few miles east of Oraibi feeding on carrion, July 27, 1933.

Breeding Notes: Four eagle nests were found by L. F. Brady on the tops of pinnacles on the old Tanner Trail about eight miles east of Cameron Bridge in August, 1930. Three of the four were accessible and had been occupied during the 1930 season and many previous seasons (Phillips). Although no direct observations of breeding have been made, the evidence seems to indicate that it must occur in widely scattered sections of the area. The birds undoubtedly require large territories during the breeding season. Bents data (USNM 167:299, 301, 302, 315) indicates that incubation requires about five weeks, tending young in nest about ten weeks, and some additional weeks outside the nest before the young leave the vicinity of the nest. This would indicate a period of about 15 weeks from egg-laying to nest-leaving. Estimating the time of egg-laying as March (known data from elsewhere in Utah), would bring the young birds out of the nest about the time our expeditions reached the field in late June and the birds should still be around the territory where reared during July and then wander farther afield later. Upon this basis, available records seem to indicate that there must be quite a number of breeding pairs widely dispersed over the area.

BALD EAGLE . . . *Haliaeetus leucocephalus*

This is undoubtedly a rare bird in the Navajo Country, probably only a visitant. The scarcity of water over most of the area would not be inviting to it. Milton Wetherill reports one seen near the Kayenta reservoir "hunting ducks" on November 12, 1935. Monson observed one near Long Lake in the Lukachukai Mountains, New Mexico, not far from the Arizona line.

MARSH HAWK . . . *Circus cyaneus hudsonius*

Migrant and winter resident; probably not a breeder here; common during August and September, during its southward migration. **Specimens:** ♀, August 9, 1937, Kaiparowits Plateau, 7000 feet (UU); ♂ skeleton, November 28, 1937, 10 miles south of Oraibi (MNA).

Observations: Merriam (1890:89-90) saw one on Tenebito (Dinnebito) Wash about mid-August, 1889, and several circling near a spring at Echo Cliffs (near Moa Ave) September 22-24, 1889. Nelson saw two birds near Tuba City August 17-20, 1909. Skinner noted one or two "every day" in open desert below 6000 feet, September 12-October 5, 1916. Goldman saw one at Chin Lee August 26, 1917. Phillips saw one north of Rio Puerco and north of Adamana May 4, 1937. Russell observed a bird in Monument Valley below Totempole, Arizona, August 15, 16, 17, 1936. Woodbury and Russell have seven records between August 12 and September 7, 1938, from the val-

leys between Kayenta and Tuba City. Brady reports one bird near Cameron, September 19, 1936. Monson has eight records in January, six in February, one in March, six in August, and many records from many places in September, October, November and December during the years 1937 to 1939.

Comment: The Marsh Hawk appears to be absent from the area from May 4 to August 12. It probably does not breed here, and appears to be more common during fall migration than during the winter. It seems to prefer the low valleys and flats and avoids the mountains.

OSPREY . . . *Pandion haliaetus carolinensis*
(Hypothetical)

Hargrave (1932:217) reports that "the Osprey unquestionably is at times found along the Little Colorado River, Arizona." He suggests that they frequent lakes of the San Francisco Mountains, whence they may reach the Little Colorado occasionally.

PRAIRIE FALCON . . . *Falco mexicanus*

A sparse breeder of rough country, also wintering in the area: **Specimens:** Skeleton of adult ♂, December 12, 1937, a few miles east of Kayenta, Navajo County, Arizona, 5700 feet (MNA).

Observations: Kennerly and Mollhausen saw this bird on the Little Colorado River a few miles NW of Winslow, December, 1853; Loring saw one chasing a raven near Bluff, Utah, November 15, 1893; Fisher (1903:34) saw one at Keam's Canyon July 18, 1894; Nelson (1909) reported observing six between Fort Defiance and Lee's Ferry from July 30 to August 27; Skinner (1916) reported seeing four in his travels during September (Cedar Springs, Ganado, Chin Lee and near Fort Defiance); Hargrave has two records in January, three in June, and one in July from the Tsegi Canyons in 1933 and 1934; Woodbury and Russell have eight records in July, six in August and one in September in the years 1935 to 1938. Lyons has one in July and Phillips one in August. Of these 16 records, 5 are from the cliffs along the San Juan and Colorado rivers, 3 from the Tsegi canyons, 3 from Navajo Mountain, 2 from Shonto Canyon, 2 from Kayenta and one from Pasture Canyon. Monson has 8 records in January, 5 in February, 8 in April, 1 each in May, June and July, 2 in August, 1 in September, 2 in October, 1 in November and 10 in December from many widely dispersed localities: Tuba City, Cameron, Tonalea, Cow Springs, Chin Lee, Toreva, Black Mountain Trading Post, Snake Butte, Tolani Lakes, Copper Mine and Glen Canyon.

Distribution: These records, well distributed through the year, indicate that it is a permanent resident, not only breeding here but remaining for winter also. It is undoubtedly a wide-ranging bird widely separated territorially, and while it breeds and haunts the cliffs of the rough country, it forages over intervening valleys and may be encountered almost anywhere, including rivers, ponds, and marshes where it hunts water-birds.

Remarks: It is not a common bird, although it occurs regularly, widely spaced; probably not more than two pairs inhabiting that portion of the Tsegi drainage studied. Several were seen along the San Juan and Colorado river cliffs. They have been observed, either singly or in pairs, to harry a Red-tail or chase swallows. Mittleman (1938 RB-MV) reported one taking a duck from the San Juan River.

Breeding Notes: The young appear to be ready to leave the nest some time in July. Full grown young out of nest were observed on July 12 and August 2.

DUCK HAWK . . . *Falco peregrinus anatum*

A casual breeder in the cliffs.

Observations: May 23, 1937, one at Keams Canyon (GM); July 4, 6, 8 and 10, 1936, on Navajo Mountain at NE spur, at War God Spring, at Soldier Seep and on west slope, San Juan County, Utah, one bird seen repeatedly and very well at distances as close as 100 feet (HNR). July 12, 1936, Tsegi Canyon, two seen circling together opposite mouth of Betatakin (LH). July 26, 1934, rim of Long Canyon nearly opposite Bubbling Springs Canyon, a pair of adults with about three young birds out of the nest seen from the mesa top (HNR). July 27, 1894, Keams Canyon, one seen flying near cliffs (Fisher 1903:34). August 2, 11 and 16, 1936, Beaver Creek Canyon, north foot of Navajo Mountain and on mountain, San Juan County, Utah; one bird which may be the same bird or the same pair as all other records around Navajo Mountain (HNR). August 19, 1938, 5300 feet, at Kayenta Reservoir, one bird (HNR). August 21, 1938, 5800 feet, Cow Springs Lake, one seen; this bird seen to alight near remains of a Cooper Hawk which appeared to have been eaten by something a day or two previously (W and R). September 17, 1936, near Red Mesa Trading Post (GM). October 5, 1916, 6000 feet, east of Navajo, one observed (MPS).

Discussion: A very wide ranging bird; possibly only a few pairs in the entire area. Observed principally on Navajo Mountain, Utah, and the rough country of the Tsegi drainage, although also seen on foraging expeditions at the lakes near Cow Springs and Kayenta, Arizona, and occasionally elsewhere. Young birds probably leave the nest in July: Russell found three young birds out of the nest on July 26.

PIGEON HAWK . . . *Falco columbarius*

Probably a winter visitant. **Observations:** January 12, 1939, one at Cow Springs and one at Marsh Pass (GM); January 23, 1934, Tsegi Canyon, seen at close range (LH); January 24, 1934, Kiet Siel Canyon, one seen high over mesa (LH); March 22, 1937, one near Gap (GM); September 19, 1936, one near Tse-non-pas (GM); October 26, 1937, one at Roof Butte in Lukachukai Mountains (GM).

EASTERN SPARROW HAWK . . . *Falco sparverius sparverius*

An abundant breeder in the cliffs of the rough country, remaining for winter also.

Specimens: ♂, April 19, 1892, Noland's Ranch, near 4-corners, San Juan River, Utah (AMNH). Juvenile ♂ and ♀, July 5, 1937, 4500 feet, Totempole, Arizona, desert cliffs (UU). Adult ♀, July 11, 1936, 9500 feet, limber pine and aspen on West Ridge of Navajo Mountain, San Juan County, Utah (UU). Adult ♀ and immature ♂, July 13, 1936, 3200 feet, Colorado River side canyon, San Juan County, Utah (UU). Nestling ♂, July 13, 1938, 6500 feet, Shonto Canyon, Navajo County, Arizona, from nest in cliffs (UU). Immature ♂, July 23, 1938, 5500 feet, Pasture Canyon, Tuba City, Coconino County, Arizona (UU). Immature ♂, July 25, 1935, Long Canyon at Bubbling Springs, Tsegi drainage, Navajo County, Arizona, 7000

feet, pigmy forest, taken from a family of three attended by adults (UU). Immature ♂, August 14, 10,000 feet, southwest side of Navajo Mountain, San Juan County, Utah, spruce-fir forest (UU).

Observations: Loring saw one at Bluff, Utah, November 12, 1893. Fisher (1903:34) reports this, in late July, 1894, as the commonest bird-of-prey at Keams Canyon, where they were observed hunting lizards and insects or flying about their nesting places in cliffs. Nelson and Birdseye (1909) record it from 11 localities during their trip from July 10 to August 26. Goldman reported it once at 7800 feet along Spruce Creek in Tunicha Mountains, August 22, 1917. Stevenson listed two near Oraibi, July 29, 1934. Jenks saw it at St. Michaels June 21, and at Keams Canyon June 26, 1933, and lists a "number" of "breeding" records in the "Painted Desert" and calls it a summer resident along the "bottom of the Little Colorado Valley." Hargrave noted it "every few miles" along Highway 66 from San Francisco Mountains east to New Mexico line during the latter half of March, 1931. Monson reports "records for every month from all parts of Reservation except Transition Zone." From the Transition Zone, he reports 4 birds from 3 localities in June, 1938, and 6 from one locality October 2, 1936. He reported 2 on the Tuba Christmas census December 19, 1936 (Monson 1937a:67). A summation of the records of our expeditions (Hargrave, Russell, Woodbury, et al) and others (Wetherill, Benson, Phillips) working in the same region (1944-1938) reveals two records for March, one each for April and May, 12 for June, 43 for July, 25 for August, 8 for September and 2 for October.

Distribution: These observations indicate that it is a widely distributed bird in the rough country. It has a relatively small territory for a hawk. Nesting in the cliffs, it forages out into the valleys and is commonly seen perched on telephone poles or trees watching for prey. It has been observed every month all over the area and at practically all altitudes (3100 to 10,400 feet). Specific localities include Tuba City (reservoir, Pasture Canyon, Moencopie Wash), along the road from Tuba City to Kayenta, including Red Lake, Cow Springs, Marsh Pass, Klethla Valley, Little Man's Lake and Long-house Valley; on top of Black Mesa in the yellow pines; in the Tsegi Canyons (Water Lily, Betatakin, Kiet Siel, Long, Bubbling Springs, Swallow's Nest); Kayenta (road, reservoir); Shonto Canyon, Monument Valley (Totempole); and the desert flats near Cameron, all in Arizona; Navajo Mountain (foot, summit, War God Spring, Soldier Seep), San Juan River, Colorado River, Kaiparowits Plateau, Utah. Other observers have reported it from additional localities: St. Michaels, Ganado, Chin Lee, Ft. Defiance, Oraibi, Keams Canyon, Lee's Ferry, Holbrook, Winslow, Painted Desert, Little Colorado Valley, Lukachukai, Roof Butte, and Sawmill. Most of the records come from foothill areas of the Upper Sonoran Zone, but enough of them are from the mountains (Navajo, Tunicha and Lukachukai) to indicate that it is probably a sparse breeder and a more common visitant to areas in the Transition Zone or higher.

Breeding Notes: Parents have been observed feeding young in the nest in inaccessible cliffs, June 30, 1938, in Tsegi Canyon (HNR), and July 13, 1938, in Shonto Canyon (W and R). Adults have been seen feeding young out of the nest July 5, 1937, at Totempole, Monument Valley (AMW) and near the foot of Black Mesa, four miles SW of Marsh Pass, July 3, 1938 (AMW); at Totempole three young were perched on a huge boulder near the nest in an inaccessible cliff; in the latter case near Marsh Pass, two young ones were perched in the tops of dead juniper trees not far from the cliffs, and

the parents made occasional visits to each, presumably with food. During an hour of observation, the female parent made three and the male parent two visits to the juvenile nearest the observer. The young made the characteristic juvenile begging call and quivered the wings as the parent approached, which was interrupted during the process of alighting. The exchange of food seemed to take place as soon as the young one could reach it, even before the adult became settled on the perch. The parent remained a moment or two while the food was being swallowed, but left almost as soon as the begging was resumed. The food appeared to be small enough to be swallowed whole and on one occasion was recognized to be a grasshopper. The second juvenile was observed to follow a parent, begging in the air. About 9:30 A.M. and again an hour later the adult male spent about 15 minutes in the air circling around the cliffs and heads of short draws, repeatedly uttering the cry of kwhee or killee repeated four to six times. At another time one of the adults flew out in the valley about one-fourth mile and perched on a telephone pole. Later, it was observed to leave the pole a short distance, hover in the air for an instant, and then pounce upon a grasshopper on the ground and carry it off.

In traveling the road along the foot of Black Mesa, sparrow hawks were observed at different times perched on telephone poles at various places, mostly opposite the mouths of the side canyons or embayments at the valley edge, suggesting the idea that a nesting pair had occupied the mouth of nearly every side canyon from the Black Mesa slope entering the open valley. When nesting begins is not clear from our observations, but it probably continues through June and the young are ready to leave the nest in early July, after which they develop more and more independence. The young were still being tended as late as July 25, 1935, in Long Canyon (HNR), but they have been found alone many times after that date.

DUSKY BLUE GROUSE . . . *Dendragapus obscurus obscurus*

Paul Phillips (Auk 54:203-4) reported seeing a pair of dusky grouse about eight miles southeast of Lukachukai, Apache County, Arizona, within about four miles of New Mexico in coniferous forest with admixture of aspen and oak in the Lukachukai Mountains at 8000 feet altitude. It has not been reported from the coniferous forests of Navajo Mountain nor other mountains bearing such forests. However, there are two records in the Lukachukai Mountains near Senastee, New Mexico, near the Arizona line, where E. D. Eaton reportedly saw four on September 4, 1934, and Monson saw a pair October 26, 1937 (Condor 1939:167), which tends to corroborate Phillips' record.

GAMBEL QUAIL . . . *Lophortyx gambelii gambelii*

A resident of the brush near the isolated springs and ranches of the Moencopie Wash near Moenave, southwest of Tuba City; probably introduced. **Specimens:** Adult ♂, July 3, 1936, one mile south and below Tuba City, Coconino County, Arizona, in Upper Sonoran farmland (MNA). Two immature birds, July 24, 1938, 5000 feet, Moenave, Coconino County, Arizona, in squawbushes (UU).

Observations: July 3, 1936, Moencopie Wash, below Tuba City, two ♂♂ seen, reported fairly common; (Local report says that these quail were brought in by a teacher named Kern about 20 years ago) (ARP). July 24, 1938, flock seen at Moenave, Arizona, among cottonwoods and squawbush (AMW). August 22, 1909, 3 or 4 coveys of partly grown young seen along the road in open weedy prairie about five miles north of divide on Cedar Ridge between

Tuba City and Lee's Ferry (Nelson and Birdseye). Monson reports seeing near Tuba City coveys of 17 to 28 birds on four dates between December 5, 1936, and February 19, 1937, and again records them on January 11, 1939. He adds that "birds introduced in 1923 or 1924 by John Kearns, according to Joe O'Neal of Tuba City."

Remarks: It is probable that quails in the Tuba City region were introduced within the last two decades, but the evidence is not clear whether there had been previous introductions or whether the birds observed by Nelson (1909) were native to the region. It seems reasonable to think that they were probably absent from the Tuba City area or they would not have been introduced, but the presence of similar birds in the vicinity of Moab, Utah, in the same drainage basin suggests that they were probably native to the region but absent from that locality (Tuba City). Phillips comments that "The status of quail in northeastern Arizona is very confusing. Bones of both *Callipepla squamata* and *Lophortyx gambeli* have been found in Indian ruins, yet neither occurs today except at and near Tuba City. Beale (Wagon Road from Fort Defiance to Colorado River, p. 50, 1858) mentions seeing "blue quails" in New Mexico, but whether he means the Rio Grande or Little Colorado Valley or both is not clear, and one is tempted to guess Rio Grande. Molhausen's report for the Little Colorado Valley (cf. Merriam, N. Am. Fauna 3) I am inclined to attribute to faulty memory. Ecologically, the Little Colorado Valley of the 19th century sounds better for *Callipepla* than *Lophortyx*, yet as early as the 1880's Scaled Quail were unknown to the Hopis (Mearns, p. 397)." Monson states that the Scaled Quail occurs in the vicinity of Gallup, New Mexico, near the Arizona line, and at many places northward toward Shiprock, in New Mexico.

MERRIAM TURKEY . . . *Meleagris gallopavo merriami*

(Hypothetical)

We have no conclusive evidence that this bird occurs in our area, but there is circumstantial evidence that it may have done so in the past. Wheeler (1872:31) in mid-November, 1871, passed over a route from Prescott through Camp Verde, Winslow, Leroux Fork and south to Fort Apache. He remarked that turkeys were seen in "northeastern and eastern Arizona," which may have referred to a part of our area. Goldman was told in August, 1917, that there were still a few in the mountains near the heads of canyons de Chelly and del Muerto. Monson states that Indian traders have informed him that the turkeys which formerly occurred in the Lukachukai Mountains 30-40 years ago were killed out by the Navaios, who found a ready market among the white men. Hargrave (1939:208) reports the taking of partial skeletons from several pueblo ruins: four from Poncho House, San Juan County, Utah; one from Betatakin and 77 from Kiet Siel, both in Tsegi drainage; and one from Awatovi near Jeddito. He concludes that "those sites from which came the greatest number of individuals are located in areas where historically the wild turkey is not known. Archaeological data, I believe, are sufficiently convincing to permit the statement that the turkey was under domestication by the people who occupied the Kayenta district area between 1272 and 1300 A.D."

SANDHILL CRANE . . . *Grus canadensis tabida*

(Hypothetical)

Sammv Day, Jr., told R. Jenks (July 11, 1933) that in early September about 1926 he saw cranes on one of the marl hills near Chin Lee. "Seven

danced around in a circle on top of a clay hill, one of the birds in the middle. They took turns changing off, but always there was one in the middle of the ring. They kept this up for a long time." Such a story seems scarcely credible and yet the time is about right and the place may be in line with their migration route. J. O. Brew reports bones of this species excavated from the Awatovi ruins, which he dates between 1400 and 1600 A.D.

VIRGINIA RAIL . . . *Rallus limicola limicola*

Probably a migrant. **Specimens:** ♂, May 14, 1892, Bluff, San Juan River, Utah (AMNH). Immature ♀, October 7, 1937, Kayenta, Arizona, bird killed by cat—wing and part skeleton (MNA). It was not found at Pasture Canyon or any of the ponds in the summer, although its presence was suspected in the thick cattails at Pasture Canyon.

SORA . . . *Porzana carolina*

A sparse breeder in the Pasture Canyon cattails and rushes, and probably a migrant through the area stopping at ponds and lakes enroute. **Specimens:** ♂ and ♀, May 11, 1933, Bluff, San Juan County, Utah (UU). Adult ♂, August 13, 22, 1938, cattails and meadows of Pasture Canyon, 5300 feet, Coconino County, Arizona (UU).

Observations: In Pasture Canyon, 5400 feet, July 22, 1938 (AMW): half-grown downy black rail in meadow grass (HNR); July 23, 1938, one bird seen (AMW); August 12, 1938, four seen (AMW); August 18, 1937, three birds (GM); August 21, 1938, upper lake, one bird seen; lower marshes, nine or more birds seen (HNR); September 7, 1938, 5400 feet, Pasture Canyon, twelve or more birds seen (HNR). September 23, 1889, Merriam (1890:88) reports finding them in the rushes at Tanner's Gulch (Pasture Canyon).

Remarks: The specimens taken at Bluff were in spring migration, but it is nearly certain, from the presence of a downy black youngster in July, that it had been breeding in Pasture Canyon during the summer of 1938. The birds seen in August and early September were doubtless in fall migration.

AMERICAN COOT (MUD HEN) . . . *Fulica americana americana*

A common migrant through the area, a breeder in Pasture Canyon: and a sparse winter resident. **Specimens:** Nest, July 14, 1938, 5500 feet, 7 eggs in abandoned nest in Kayenta reservoir marsh, Navajo County, Arizona (UU). Adult and immature ♂♂, July 21-24, 1938, 5200 feet, marshes in Pasture Canyon near Tuba City, Coconino County, Arizona (UU).

Observations: Coots have been observed in Pasture Canyon either in the rushes and cattails around the upper pond or at the Hopi Reservoir a mile below the fenced area as follows: Merriam (1890:88) reported thousands in the rushes on September 23 and 24, 1889; 5 observed on July 9, 1936, by Phillips, 6 on July 20, 1938, and many birds including young ones July 21 and 23, August 12, 13 and 22, and September 7, 1938, by Woodbury and Russell; several in August 1909, by Nelson and Birdseye; and 5 on December 8 and 10, 1936, by Monson. At Cow Springs Lake, 3 dead ones probably killed during July were found July 19 and one live one observed August 15, 1938, by Woodbury and Russell. At the Kayenta Reservoir marshes Monson saw approximately 150 April 9, 1937, and Woodbury and Russell found

an abandoned nest with 7 eggs on July 14, 1938, but saw no birds, and Wetherill reported about 1000 November 29-30, 1941. Lyons reported one on the Colorado River below mouth of Bridge Canyon July 15, 1936; Skinner reported five on reservoir south of Fort Defiance September 28, 1916. At a lake between Joseph City and Holbrook, they were abundant May 4, 1937 (ARP). 2 seen March 18, 1931 (LLH), and about 125 were there February 7, 1938 (GM). Monson has several other records: one on tank at Snake Butte, February 16, 1939; at Red Lake north of Fort Defiance, 33 on June 23, 1938, 16 on August 29, 1938, and about 200 on September 30, 1936; 2 near White Cone Trading Post July 7, 1937; 40 near St. Michaels October 6, 1936; and one on Tuba City Reservoir December 7 and 8, 1936.

Distribution: This bird was found breeding in 1938 in the thick rushes and cattails of Pasture Canyon where the vegetation was protected from excessive grazing by fences. Probably several pairs nested on the ponds. Half-grown young were noted on July 20 and were observed from time to time until September 7, by which time the young were nearly grown. The abandoned nest found July 14 at the nearly dry Kayenta Reservoir indicated an attempt to breed at that place, unsuccessful because of the unsuitable water level. Three dead birds probably killed during July found at Cow Springs Lake on July 19 may indicate further unsuccessful attempts to summer in the area.

KILLDEER . . . *Charadrius vociferus vociferus*

A permanent resident, undoubtedly a breeder and a common migrant and winter resident. **Specimens:** ♀, May 16, 1892, Riverview, San Juan River, Utah (AMNH). ♀, July 8, 1937, 4500 feet, Monument Valley pond (UU). July 31, 1933, 5800 feet, Kayenta, Navajo County, Arizona (MVZ). Immature ♀, July 14, 1938, 5500 feet, marshes at Kayenta Reservoir, Navajo County, Arizona (UU). Immature ♂, August 5, 1934, 6600 feet, Dogoszhi Biko, Navajo County, Arizona (MNA). August 11, 1937, 7000 feet, pond on Kaiparowits Plateau, Kane County, Utah (UU).

Observations: Merriam (1890:89) reports a few birds observed at scattered pools along the bed of the Little Colorado not far from Grand Falls August 13 and 14, 1889. From June 23 to September 7 we have two records for June, 19 for July, 16 for August and 6 for September during the years 1931 to 1938. Monson has 10 records from October to February during the years 1936 to 1939, as well as a number during the spring and summer months. Other records include those of Streater of April-May, 1893; Nelson and Birdseye, August, 1909; Skinner, September 28, 1916; Jenks, June, 1933; Stevenson, July 28, 1934; and Lockett, December 15, 1938. Phillips and Wetherill.

Distribution: The records occur in nearly every month of the year and they are so well distributed in space that it is doubtful if there is a body of water in the area anywhere that is not visited by this bird. The killdeer is so widely distributed at all of the water holes, ponds, lakes and marshy spots, and even on some streams, that we regard it as a breeder despite our lack of nesting records. The taking of immature specimens on July 14 and August 5 and the observation of many immature birds at different times tends to corroborate our conclusions.

AMERICAN CURLEW . . . *Numenius americanus*

A spring and fall migrant, stopping at bodies of water along the way. **Specimens:** *N. a. americanus* . . . Long-billed Curlew: Adult ♀, containing six

eggs. April 11, 1938, Kayenta reservoir, Navajo County, Arizona, 5680 feet. Measurements: bill 182 mm., wings (much worn) 286 and 292 mm. (MNA Z8.1121). Adult ♀, August 14, 1938, 5800 feet, Cow Springs Lake, Coconino County, Arizona (UU 4140). Measurements: bill 131 mm., wings 286 mm.

N. a. parvus . . . Northern Curlew: Adult ♀, April 11, 1938, Kayenta Reservoir, Navajo County, Arizona (from same flock as Z8.1121). Measurements: bill 125 mm., wings (much worn but less than wear on Z8.1121) 260 mm. (MNA Z8.1122).

Observations: August 11, 1938, Ganado Lake, one seen (GM). August 14-15, 1938, 5800 feet, Cow Springs Lake, 3 observed (W and R). August 15, 1938, 5800 feet, Little Man's Lake, 2 seen (W and R). The two specimens of different subspecies taken from the same flock near Kayenta indicate that both subspecies occur in the area, and hence it is not safe to assign observation in the field to subspecies.

LESSER YELLOW-LEGS . . . *Tringa flavipes*

A migrant, stopping at the valley ponds along the way, 5000 to 6000 feet. **Specimens:** Female skeleton, August 12, 1937, in Pasture Canyon near Tuba City, Coconino County, Arizona (MNA). Adult ♀, July 20, 1938, 5300 feet, open water in Tuba City Reservoir, Coconino County, Arizona (UU). Adult ♀, August 12, 1938, 5300 feet, marshes, Pasture Canyon, Coconino County, Arizona (UU).

Observations: April 9, 1937, Kayenta Reservoir, 3 seen (GM). July 9, 1936, Lower Pasture Canyon near Tuba City, a yellow-legs seen, not certainly this species (ARP). July 20, 1938, 5300 feet, Tuba City Reservoir, 1 seen (AMW). July 24, 1936, Tuba City, about one-half dozen shore birds believed to be yellow-legs were observed from passing car (LH). July 29, 1934, lake south of Oraiba (Jenks and Stevenson 1937a:41). August 11, 1937, White Cone Trading Post Reservoir, one seen (GM). August 12, 13, 1938, 5400 feet, Pasture Canyon and vicinity, 5 and 4 birds (AMW). August 14, 15, 1938, 5800 feet, Cow Springs Lake, 30 and 14 birds seen, and at Little Man's Lake 6 birds seen (AMW). August 21, 1938, 5800 feet, Cow Springs Lake, 2 seen, and 5300 feet at pond one mile southeast of Tuba City, 11 seen (AMW). August 22, 1938, 5300 feet, Pasture Canyon, 4 seen (AMW). September 13, 1938, Tonalea, one observed (GM).

Notes: This bird usually comes in small groups often associated with other shore birds. Available records are mainly from the Tuba City region, but a few come from other valley ponds and lakes well distributed over the Navajo Country.

GREATER YELLOW-LEGS . . . *Tringa melanoleucus*

A migrant in small numbers. **Specimens:** Female, July 31, 1933, 5800 feet, Kayenta, Navajo County, Arizona (MVZ). Adult ♀, August 15, 1938, 5800 feet, open pond between Cow Springs and Tonalea (Red Lake); Coconino County, Arizona (UU).

Observations: July 4, 1936, Moencopi Wash below Tuba City, one seen along creek identified by size in comparison with killdeer, and by 3 calls (ARP). July 8, 1937, White Cone Trading Post Reservoir (GM). July 9, 1936, Moencopi Wash below Tuba City, a yellow-legs in flooded fields:

doubtless same bird (ARP). July 13, 1938, 5300 feet, in Kayenta Reservoir marsh, 1 heard (W and R). July 21, 1938, 5300 feet, Pasture Canyon Reservoir, 1 bird (AMW). July 29, 1934, pond four miles south of Oraibi, 5600 feet, 3 seen (JOS). August 14, 1938, 5800 feet, Cow Springs Lake, 3 birds; and pond between Cow Springs and Tonalea (Red Lake), 2 birds (AMW). August 15, 21, 1938, 5800 feet, Cow Springs Lake, 4 and 3 birds (AMW). August 18, 1937, Hopi Reservoir in Pasture Canyon, 1 seen (GM). August 22, 1938, 5400 feet, Pasture Canyon Reservoir, 5 birds (AMW).

Notes: This bird has been observed in much smaller numbers than the Lesser Yellow-legs. Our dozen records come from valley ponds between Kayenta and Tuba City and elsewhere, principally during July and August.

WESTERN SOLITARY SANDPIPER . . . *Tringa solitaria cinnamomea*

A summer migrant, probably not a breeder. *Specimens:* July 9, 1937, 5400 feet, Monument Valley, pond two miles southwest of Poncho House, San Juan County, Utah (UU). Adult ♂, July 14, 1938, 5500 feet, mud flats among rushes of Kayenta Reservoir, Navajo County, Arizona (UU). Adult ♂, August 15, 1934, 6500 feet, Dogoszhi Biko, one-half mile below Water Lily Canyon, Tsegi Canyons, Navajo County, Arizona (MNA).

Observations: July 4, 1936, Moencopi Wash below Moencopi, one seen along the creek (ARP). July 7, 1936, Upper Pasture Canyon, one seen in wet meadows (ARP). July 11, 1935, Lower Bubbling Springs Canyon, a single bird seen along the water in the bottom (HNR). July 13, 1937, reservoir in Hopi Buttes, 1 observed (GM). July 13, 14, 1938, 5300 feet, Kayenta Reservoir marshes, 3 birds (W and R). July 15, 1938, marshes of Kayenta Reservoir two seen repeatedly, one feeding in shallow water up to bellies (HNR). July 18, 1933, Mexican Water, one bird (LH). July 19, 1938, Cow Springs Lake, 1 seen (AMW). July 20, 21, 1938, 5300 feet, Pasture Canyon Reservoir, 2 and 2 birds seen (AMW). August 12, 13, 1938, Pasture Canyon and vicinity, 3 and 2 birds seen (AMW). August 14, 15, 1938, Cow Springs Lake, 2 and 1 birds seen (AMW). August 19, 1938, 5800 feet, marshes west of Kayenta, 2 observed (AMW). August 21, 1938, 5800 feet, pond near Little Man's Lake, 1 bird; Cow Springs Lake, 1 seen, 5300 feet: pond by road one mile southeast of Tuba City, 3 seen (AMW). August 22, 1938, 5300 feet, Pasture Canyon, 5 observed (AMW). August 29, 1938, Red Lake north of Fort Defiance, 1 bird seen (GM). August 30, 1934, Betatakin to Kiet Siel, observed (MAW). Septemebr 7, 1938, 5400 feet, Pasture Canyon lower marshes, 3 seen (HNR).

Distribution: Despite the occurrence of this bird at least from July 4 to September 7, we have no evidence of its breeding here. It is probably a summer migrant. Woodbury has observed it breeding at an altitude of 8500 feet on Cedar Mountain, Iron County, Utah, 100 miles northwest of Navajo Mountain, but there are no similar habitats on the latter mountain, and it probably does not breed in the canyon streams or valley ponds, although it visits both during the summer. Our records of two dozen observations of this bird show it distributed from Monument Valley, Utah, to Moencopie Wash, Arizona, including Kayenta, Tsegi canyons, Little Man's Lake, Cow Springs and Pasture Canyon.

SPOTTED SANDPIPER . . . *Actitis macularia*

A sparse breeder and a more common migrant. *Specimens:* Two downy young, July 3, 1935, 6300 feet, Tsegi Canyon, one mile below mouth of

Bubbling Springs Canyon, Navajo County, Arizona (UU). Female, July 20, 1937, 3300 feet, Colorado River shore at Rock Creek, Kane County, Utah (UU). Adult ♂, July 20, 1938, 5300 feet, at edge of water, Tuba City Reservoir, Coconino County, Arizona (UU). Male, July 31, 1933, 5800 feet, Kayenta, Navajo County, Arizona (MVZ).

Observations: Nelson saw several birds near Tuba City in August, 1909. Wetherill saw one in Kiet Siel Canyon in the Tsegi drainage May 4, 1936. Monson saw several at water south of Polacca and near Snake Butte, May 17 and 18, 1937; one at small reservoir in Hopi Buttes, July 19, 1937; and several during August at Hopi Buttes, Ganado, Oraibi and Red Lake north of Ft. Defiance. On the Colorado River, August 7-10, 1938, Woodbury and Russell tallied 17 individuals distributed along the sandy shores of the stream while descending the last 44 miles to Lee's Ferry. August 12, 1938, 5400 feet, Pasture Canyon and vicinity, 5 seen (AMW). August 15, 1938, 5800 feet, one observed at Cow Springs Lake and one at Little Man's Lake (W and R). August 21, 1938, 5800 feet, 2 at Little Man's Lake and 3 at Cow Springs Lake (W and R). August 22, 1938, 5400 feet, Pasture Canyon Reservoir, 6 seen (AMW). August 16, 1936, Kiet Siel Canyon, 1 seen (MAW). August 20, 1936, 6000 feet, observed at Kayenta Reservoir, Navajo County, Arizona (HNR). September 7, 1938, 5300 feet, Tuba City Reservoir, 1 observed (HNR).

Distribution: The little spotted sandpiper is casually distributed at some time during the summer along the shores of nearly all the streams, ponds and lakes of the region. In early summer it is rather sparse, but becomes much more common during August. It is well distributed, but widely spaced along the San Juan and Colorado Rivers. During our 1938 trip we estimated an expectancy of one every five miles. As elsewhere they were inhabitants of the sandy shore below the high water mark. The balance of the records available come mainly from the streams of the Tsegi canyons and from the valley ponds and streams from many localities: Kayenta to Tuba City, Leupp, Hopi Buttes, Ganado, Oraibi, Fort Defiance.

Breeding Notes: Russell reports that a single pair nested along the water-course of the main Tsegi Canyon near the mouth of Bubbling Springs Canyon in 1935. Two downy young were captured on July 3 and a third one two days later. The brood evidently emerged about the first of July. One of the young captive birds surprised the party by calling gently in notes just like the parent. The young probably begin to move around in late July about the time the birds begin to be much more common. Undoubtedly migrants add to the population at this time. Most of them seem to be gone by September.

WESTERN WILLET . . . *Catoptrophorus semipalmatus inornatus*

A spring and late summer migrant, stopping at ponds along the way.
Specimens: Adult ♀, May 5, 1938, 5860 feet, at Kayenta Reservoir, Navajo County, Arizona (MNA). Adult ♀, August 12, 1938, 5300 feet, open pond near Tuba City, Coconino County, Arizona (UU).

Observations: July 21, 1938, 5300 feet, Pasture Canyon reservoir, 1 bird (AMW). August 12, 13, 1938, 5400 feet, Pasture Canyon and vicinity, 2 and 1 seen (AMW). August 15 1938, 5800 feet, Little Man's Lake, 1 seen (AMW). August 21 1938, 5800 feet, Cow Springs Lake, 2 observed (AMW).

Notes: So far as our records show, most of the birds are stragglers, one or two at a time, often associated with other migratory shore birds. All of our records come from the valley ponds between 5000 and 6000 feet altitude.

LONG-BILLED DOWITCHER . . . *Limnodromus griseus scolopaceus*

Specimens: Adult ♂, August 13, 1938, Pasture Canyon, Coconino County, Arizona, bill 60 mm. (UU).

Observations: March 24, 1937, reservoir near Bodaway House, 10 miles southwest of Gap Trading Post, one seen (Monson 1939:167). August 13, 1938, Pasture Canyon, 2 observed (HNR).

WILSON SNIBE . . . *Capella delicata*

A migrant through the area and possibly a sparse winter resident. There is no evidence of breeding here. **Observations:** March 1-13, 1886, seen at Keams Canyon by "Sullivan" (USBS). September 6, 1938, 5300 feet, marsh by side of road one mile southeast of Tuba City, 3 seen in flight (HNR). September 7, 1938, 5400 feet, Pasture Canyon, upper lake, 1 in flight (HNR). December 15, 1938, near Tuba City by H. C. Lockett.

BAIRD SANDPIPER . . . *Erolia bairdii*

A sparse migrant. **Specimens:** Adult ♀ skeleton, August 12, 1937, in Pasture Canyon near Tuba City, Coconino County, Arizona; abundant in flock (MNA). Adult ♀, August 12, 1938, 5200 feet, marshes in Pasture Canyon, Tuba City, Coconino County, Arizona (UU). Immature ♂, August 19, 1938, 5500 feet, marshes and mud flat at Kayenta Reservoir, Navajo County, Arizona (UU).

Observations: July 8, 1938, Little Man's Lake, 10 miles southwest of Marsh Pass Camp; a single bird in flight flew away to the northwest toward Shonto Canyon, thought to be Baird Sandpiper because of voice (HNR). August 12, 1937, Pasture Canyon, flock (AMW). August 12, 1938, Pasture Canyon, one bird (AMW). August 14, 15, 1938, 5800 feet, Cow Springs Lake, 1 and 2 birds were seen (AMW). August 19, 1938, 5300 feet, marshes at Kayenta Reservoir, 4 birds seen (AMW). August 21, 1938, 5800 feet, pond near Little Man's Lake; and Cow Springs Lake, six and two birds seen (AMW).

Notes: This sandpiper from the Arctic apparently passes through this area in small numbers during August, stopping at the valley ponds along the way, usually associated with much larger numbers of the Least and Western sandpipers along the shallow water or muddy shores of the ponds. We have only one questionable record before August, but no observations on September 6 and 7 when the Tuba City area was visited.

LEAST SANDPIPER . . . *Erolia minutilla*

A common migrant. **Specimens:** Adult ♀ and immature ♂, July 19, 1938, 5800 feet, muddy shore at Cow Springs Lake, Coconino County, Arizona (UU). Immature ♂, July 24, 1938, 5200 feet, marshy meadows, Pasture Canyon Reservoir, Coconino County, Arizona (UU).

Observations: Mid-July, 1864, along Little Colorado River, seen in flocks (Coues, 1866). July 20, 1938, 5800 feet, Red Lake, Coconino County, Arizona, 1 seen (AMW). August 12, 1938, 5400 feet, Pasture Canyon and

vicinity, 3 birds seen (AMW). August 14, 1938, 5800 feet, Cow Springs Lake, 15 seen; pond between Cow Springs and Red Lake, 5 seen (AMW). August 15, 1938, 5800 feet, Cow Springs Lake, 35 seen (AMW). August 19, 1938, 5300 feet, marshes at Kayenta Reservoir, 25 seen (AMW). August 21, 1935, Kiet Siel Canyon, number seen about three miles below Kiet Siel Pueblo on sand bar in stream (HNR). August 21, 1938, 5800 feet, pond near Little Man's Lake, 3 seen; Cow Springs Lake, 2 seen; 5300 feet, pond by road one mile southeast of Tuba City, 18 observed (AMW). August 22, 1938, 5300 feet, lower Pasture Canyon, 4 seen; 5400 feet, Pasture Canyon Reservoir, 17 counted (AMW). September 7, 1938, 5400 feet, lower marshes in Pasture Canyon, 2 seen (HNR).

Notes: The Least Sandpiper is fairly common on the muddy shores or shallow water of the valley ponds from mid-July at least until early September. It is often associated with Baird and Western sandpipers, the former in smaller, the latter in greater numbers, usually in small or medium-sized flocks, mixed flocks sometimes reaching more than a hundred. Our records come mostly from the valley ponds, reaching from Kayenta to Tuba City including Little Man's, Cow Springs and Pasture Canyon lakes, but there is one record from the Tsegi canyons and one from the Little Colorado River.

WESTERN SANDPIPER . . . *Ereunetes mauri*

A common migrant, stopping at the valley ponds along the way. **Specimens:** Immature ♂, July 20, 1938, 5300 feet, open water in Tuba City Reservoir, Coconino County, Arizona (UU). Adult ♀, August 11, 1938, 3100 feet, sandbar near Lee's Ferry, Colorado River, Coconino County, Arizona (UU).

Observations: May 1, 1933, Wildcat Mesa, one seen (GM). July 9, 1936, reservoir at Tuba City, one female (ARP). July 20, 1938, 5300 feet, Tuba City Reservoir, 2 birds seen (AMW). August 11, 1938, 3100 feet, one-half mile below Lee's Ferry, mouth of Paria Creek, one seen (AMW). August 11, 1937, White Cone Trading Post Reservoir, 12 observed (GM). August 12, 13, 1938, 5400 feet, Pasture Canyon, 15 and 8 seen (AMW). August 14, 1938, 5800 feet, Cow Springs Lake, 50 birds; pond between Cow Springs Lake and Red Lake, 11 seen (AMW). August 15, 1938, 5800 feet, Cow Springs Lake, 100 observed (AMW). August 19, 1938, 5300 feet, marshes west of Kayenta, 4 seen (AMW). August 21, 1938, 5800 feet, pond near Little Man's Lake, 10 observed; Cow Springs Lake, 11 seen; pond by road one mile southeast of Tuba City, one bird (AMW). August 22, 1938, 5300 feet, Pasture Canyon, 8 birds (AMW). September 7, 1938, 5400 feet, Pasture Canyon, lower marshes, 8 seen (HNR).

Notes: The Western Sandpiper is a common bird on the muddy shores or in the shallow water of the valley ponds and streams from late July at least until early September. It is often associated with Baird and Least sandpipers, but in 1938 seemed to outnumber the others. All available records except two on the Colorado River, near Lee's Ferry, come from the valley ponds and streams. Presumably the major southward migration occurs in August, but probably begins in July and extends into September.

AVOCET . . . *Recurvirostra americana*

A late summer migrant, stopping at the ponds along the way. **Specimens:** Immature ♂, July 20, 1938, 5800 feet, muddy shore, Tonalea (Red Lake), Coconino County, Arizona (UU). ♀, July 31, 1933, 5300 feet, near Kayenta, Navajo County, Arizona (MVZ).

Observations: July 19, 20, 24, 1938, 5800 feet, Tonalea (Red Lake), Coconino County, Arizona, 5, 2 and 2 birds (AMW). August 11, 1937, White Cone Reservoir, 3 seen (GM). August 13, 1938, 5400 feet, pond between Red Lake and Cow Springs, 30 seen (AMW). August 13, 1889, Merriam (1890:88) reported 20 encountered at a temporary pond near Little Colorado River not far from Grand Falls. August 14, 15, 1938, 5800 feet, Cow Springs Lake, 36 seen (AMW). August 18, 1937, Tonalea, 2 seen (GM). August 19, 1937, Tolani Lakes, one observed (LLH). August 21, 1938, 5800 feet, Cow Springs Lake, 4 encountered (AMW); pond between Cow Springs Lake and Red Lake, 2 seen (AMW). August 24, 1932, Tolani Lakes, 25 observed (LLH). August 24, 1934, Little Colorado River near Leupp, 3 seen (HNR). September 3, 1938, Tonalea, 6 found (GM). October 7, 1926, Little Colorado River near Winslow, 3 reported (Ludlow Griscom).

Notes: The Avocet is doubtless a regular migrant passing this way in small numbers. We have about 16 records and the largest flock contained 35 birds. The dates range from July 19 to October 7, and the altitudes all appear to lie between 5000 and 6000 feet. Three of the records are from the Little Colorado River but the balance are from valley lakes or ponds.

RED PHALAROPE . . . *Phalaropus fulicarius*

Status: Accidental. **Specimens:** Adult ♀, July 19, 1938, 5800 feet, open water of Cow Springs Lake, Coconino County, Arizona (UU).

Notes: The specimen reported above appears to be a first record for Arizona (Woodbury, Condor, 1939, 41:157). It was found by Russell and Woodbury at Cow Springs Lake where there were a few aquatic birds, including a Treganza Blue Heron, a Baldpate, a Pintail, two Lesser Scaup Ducks, a Ruddy Duck, two Wilson Phalaropes, two Least Sandpipers and a Solitary Sandpiper. The Red Phalarope tended to associate with the Scaup and Ruddy ducks and usually flew with them when they were flushed. The lake has no natural outlet and depends upon intermittent streams for its maintenance. At mid-July it was at low water level and choked with pondweed. We had a difficult time to take the specimen. Russell waded the lake in an effort to drive the birds toward Woodbury hidden behind an improvised blind of tumble weeds. Russell got stuck in the mud and sank to his neck. Instead of yelling for help, he insisted that Woodbury take the specimen before going to his rescue. Afterward, a long rope was sent out to him by a member of the crew and he was pulled out.

WILSON PHALAROPE . . . *Steganopus tricolor*

A spring and late summer migrant, stopping at the ponds along the way. **Specimens:** ♀, May 3, 1892, Riverview, San Juan River, Utah (AMNH). Immature ♀, July 19, 1938, 5800 feet, muddy shore, Cow Springs Lake, Coconino County, Arizona (UU). Immature ♂♂, July 20, 1938, 5200 feet, marshes Pasture Canyon, Coconino County, Arizona (UU). Juvenile, August 2, 3, 1937, 7000 feet, pond, Kaiparowits Plateau, Utah, from a flock probably in migration (UU). Immature ♂, August 14, 1938, 5800 feet, muddy shore, pond near Red Lake, Coconino County, Arizona (UU).

Observations: May 13, 14, 1937, reservoir on Wildcat Mesa, flocks of 10 and 7 (GM). May 18, 1937, reservoir near Snake Butte, flock of 12 (GM). July 19, 1938, 5800 feet, Cow Springs Lake, 2 seen (W and R). July 20, 1938, 5300 feet, Pasture Canyon reservoir, 2 birds; 5800 feet, Red Lake.

Coconino County, Arizona, 6 observed (W and R). August 2, 3, 1937, 7000 feet, pond on Kaiparowits Plateau, flock (AMW). August 12 1938, 5400 feet, Pasture Canyon, 3 seen (AMW). August 13, 1936, Red Lake (Tonalea), Coconino County, Arizona, flock of 14 (ARP). August 14, 1938, 5800 feet, Cow Springs Lake, 1 seen; pond between Cow Springs and Red Lake, 2 seen (W and R). August 15, 1938, 5800 feet, Little Man's Lake, 17 counted; Cow Springs Lake, flock of 30 (W and R). August 19, 1938, 5300 feet, marshes at Kayenta Reservoir, 1 seen (HNR). August 21, 1938, 5800 feet, Cow Springs Lake, 2 observed (W and R). August 29, 1938, Red Lake north of Fort Defiance, 4 encountered (GM).

Notes: The Wilson Phalarope is doubtless a regular migrant although available records, except the one of 1892, are limited to 1936 and 1938. They come from ponds on the Kaiparowits Plateau in Utah and from open ponds, lakes or reservoirs in Arizona, scattered throughout the area. Southward migration appears to continue from mid-July to late August.

NORTHERN PHALAROPE . . . *Lobipes lobatus*

A late summer migrant, stopping at the ponds along the way. **Specimens:** Adult ♂, August 15, 1938, 5800 feet, muddy shore of pond near Red Lake (Tonalea), Coconino County, Arizona (UU).

Observations: August 14, 1938, 5800 feet, Cow Springs Lake, flock of 25 seen; pond between Cow Springs Lake and Red Lake, 3 observed (W and R). August 15, 1938, 5800 feet, Cow Springs Lake, 1 seen (AMW). August 21, 1938, 5800 feet, Little Man's Lake, flock of 82; Cow Springs Lake, 25 seen; pond between Cow Springs Lake and Red Lake, flock of 115 (W and R).

Notes: Our observations of this bird come from Little Man's, Cow Springs and Red (Tonalea) lakes, and all between August 14 and 21, 1938. The Wilson Phalarope came a little earlier, but the Northern came in much larger numbers when it arrived, some of the flocks running as high as 115 birds. They were doubtless in southward migration.

RING-BILLED GULL . . . *Larus delawarensis*

This gull is probably a migrant. Phillips intimates that it may be more common than the records indicate. **Specimens:** Adult ♀, April 2, 1938, at Kayenta Reservoir (MNA). **Observations:** November 29-30, 1941, Kayenta Reservoir, 2 seen (MAW).

BONAPARTE GULL . . . *Larus philadelphia*

Probably only a straggler in migration. **Specimen:** Adult ♂, May 5 1938, 5860 feet, Kayenta Reservoir, Navajo County, Arizona (MNA). **Observation:** Two on Little Colorado River at Leupp, August 24, 1934 (HNR).

BLACK TERN . . . *Chlidonias nigra surinamensis*

Probably a regular if not common migrant stopping at ponds and streams enroute through the Navajo Country. **Specimens:** Adult ♂, August 14, 1938, 5800 feet, from flock of 14 flying over Cow Springs Lake, Coconino County, Arizona (UU).

Observations: August 11, 1938, Ganado Lake, 6 seen (GM). August 15, 1938, 5800 feet, Cow Springs Lake, 1 seen (AMW). August 24, 1934, Little Colorado River at Leupp, 4 recorded (HNR).

BAND-TAILED PIGEON . . . *Columba fasciata fasciata*

June 19, 1933, Navajo Mountain, San Juan County, Utah. A pile of feathers from a freshly killed bird was found at War God Spring. Miss Kellogg heard the note of one the same day (Benson). Probably resident on Navajo Mountain.

WESTERN MOURNING DOVE . . . *Zenaidura macroura marginella*

A common breeder at all altitudes and in many types of cover. **Specimens:** ♂, April 30, 1892, Riverview, San Juan River, Utah (AMNH). Mid-May, 1858, Fort Defiance, specimen (Baird 1861:5-6). ♂, July 5, 1937, 4500 feet, desert brush, 2 miles southwest of Totempole, Monument Valley, Arizona (UU). Skeleton, July 9, 1937, 4500 feet, 2 miles southwest of Poncho House on Chin Lee Wash, San Juan County, Utah (UU). ♀, July 12, 1937, 4500 feet, cliffs, Goulding, Utah (UU). Adult ♀, July 18, 1936, 3100 feet, rabbit brush, Ferry Swale on Colorado River above Lee's Ferry, Coconino County, Arizona (UU). Juvenile ♂ skeleton, July 20, 1937, 3200 feet, streamside trees, Rock Creek, near Colorado River (UU). Juvenile ♀, July 24, 1937, 3200 feet, streamside trees, Rock Creek (UU). ♂, July 26, 1937, 3600 feet, Rock Creek (UU). Adult ♀, July 27, 1936, 6000 feet, pigmy forest, 4 miles north of Navajo Mountain Trading Post, San Juan County, Utah (UU). Nest and two eggs, August 1, 1938, 3400 feet, 3 miles above Piute Rapids, San Juan River, San Juan County, Utah (UU). Adult ♂, August 1, 1935, 6200 feet, Marsh Pass, Navajo County, Arizona (UU). Juvenile, August 3, 1937, 7000 feet, sagebrush, Kaiparowits Plateau, Kane County, Utah (UU). Adult ♀, August 16, 1935, 9000 feet, War God Springs, ponderosa pine, Navajo Mountain, San Juan County, Utah (UU).

Observations: 120 compiled records of observations from several sources when summarized reveal the following: One record in January, 2 in February, 2 in April, 9 in May, 35 in June, 40 in July, 30 in August, 2 in September and 1 in October. Merriam (1890:89) reported it to be common on the desert of the Little Colorado and noted that hundreds came at dusk to drink at the spring where the party was camped on the night of August 20, 1889, five miles west of Grand Falls.

Distribution: The Mourning dove is one of the most widely distributed of birds, both in area and in altitude. It has been observed at many altitudes, from the lowest point on the Colorado River, 3100 feet, near Lee's Ferry, Arizona, to 9000 feet on Navajo Mountain, Utah. It seems to be no respecter of altitude. It is almost equally non-obligate to the vegetative cover, inhabiting nearly all kinds with great facility. In the desert areas it does seem to require some water to drink and is often found near springs, ponds or streams, but on the other hand can fly long distances to get water and so becomes widely distributed through the desert areas. It has been observed in nearly all of the places which the expeditions have visited: the Kaiparowits Plateau, the San Juan and Colorado Rivers, Monument Valley and Navajo Mountain in Utah; Kavena, Marsh Pass, the Tsegi canyons, Kletthla Valley, Shonto Canyon, Tuba City and vicinity in Arizona, and has been observed by Monson and others in many other places. It probably arrives in April. We have in round numbers a hundred records of its occurrence between April 22 and October 17.

Monson says the bulk fall departure takes place about September 15-20, but he has one record of six birds as late as October 17 and a single January 6. The bird appears to be common in pairs in the early season, but after the young emerge from the nests it is more commonly found in small groups. We have a record of a nest with two half-grown young on July 31, 1938, on the San Juan River, and a nest with two badly incubated eggs August 1 a few miles farther down the river. These probably represent second or third broods.

CALIFORNIA CUCKOO . . . *Coccyzus americanus occidentalis*

Birdseye took a specimen (USNM ♂) from a cottonwood tree on the Little Colorado River two miles east of Winslow, July 21, 1909. Cottam took a specimen (BYU) among the trees in fields at Bluff, Utah, along the San Juan River, July 2, 1927. Probably casual breeder of deciduous streamside trees.

ROAD-RUNNER . . . *Geococcyx californianus*

A sparse resident. **Specimens:** Kennerly and Mollhausen took a specimen on the Little Colorado River, 25 miles west of Holbrook (between Havre and Hobson?), December 7, 1853.

Observations: Fisher (1903:35) was told that it was "quite rare" at Keams Canyon in late 1894, and reported seeing tracks of this bird which was well known to the Mokis. Jones and Dawson (1900) report that one was "seen from the train just west of Holbrook, Arizona," on July 2, 1900. Nelson "was told it was occasional" on the Little Colorado River in 1909. Skinner saw one north of Holbrook, 5200 feet, September 12, and one at Keams Canyon, September 16, 1916. Hargrave saw one just west of Oraibi, October, 1929 or 1930. Phillips reported one on the mesa south of Tuba City in July, 1936, and says "I was informed at the Kerley Trading Post that these birds are occasionally seen between there and Tuba City." The Road-Runner is probably a sparse resident of the southern and western portions of the area.

GRAND CANYON SCREECH OWL . . . *Otus asio mycophilus*

Status: Rare. **Specimen:** Female, July 6, 1927, 6500 feet, pigmy conifers, 30 miles north of Oraibi, Coconino County, Arizona (USNM).

Comment: The specimen above was taken by Trapier, who collected for Cantwell in the 1927 survey. The bird is doubtless rare in our area as are screech owls throughout northern Arizona. We have never heard its quavering call during our several summers.

FLAMMULATED SCREECH OWL . . . *Otus flammeolus flammeolus*

A breeding resident of the ponderosa pines, aspens and pigmy conifers. **Specimens:** Adult ♂, July 6, 1936, 8500 feet, willows by War God Springs, Navajo Mountain, San Juan County, Utah (UU). Juvenile, August 12, 1934, pigmy forest, Betatakin Canyon, Navajo County, Arizona (MNA).

Observations: June 12, 1936, Long House Valley, 18 miles from Kayenta toward Tuba City, nest about 50 yards east of road, 11 feet up in dead juniper; nest 16 inches deep contained adult and two young (MAW). July 6, 12, 20, 21, 1936, observed by H.N.R. in camp at War God Springs, Navajo Mountain, usually in the pine forest but also in the willows alongside the spring, one or two heard calling on each date. August 8, 1936, 6500 feet,

pigmy forest, east rim of Beaver Creek Canyon, San Juan County, Utah, one heard calling at nightfall (HNR). August 9, 1936, 4500 feet, Beaver Creek Canyon at Bernheimer Trail, eight miles north of Navajo Mountain, San Juan County, Utah, scrub oaks and willows; one seen in broad daylight (L.C.Cole).

Distribution: This bird is a breeding resident, most common among the pines and aspens of Navajo Mountain, but sparsely distributed in favorable areas of the pigmy conifers. Since it nests in holes in trees, it would be dependent upon natural cavities or upon holes excavated by woodpeckers. In either case, its distribution during the nesting season would be more or less limited by the availability of the nesting holes. Our records are almost exclusively from the Tsegi canyons and Navajo Mountain, 4500 to 8500 feet altitude, although it doubtless occurs in other places and other altitudes. Wetherill's record of a nest containing two partly grown young on June 12 suggests that the broods probably emerge during June, and the young would be well distributed in July. The stomach of an adult contained only insects—chiefly the commonest beetles. The voice of this bird as heard on Navajo Mountain is a soft, ventriloquial "coo," a single note repeated at regular intervals, perhaps four or five times per minute.

HORNED OWL . . . *Bubo virginianus*

A permanent resident of cliffs or trees at all altitudes. **Specimens:** ♂, June 9, 1927, Oraibi (USNM). Skeleton only, July 11, 1937, Monument Valley, Navajo County, Arizona, three miles south of Arizona-Utah line on the Kayenta-Bluff road. Note: The bones are consistent with an exceptionally large female *Bubo v. pallescens*, and appear too large for *B. v. pacificus*. The wing bones are particularly long (HNR). Immature ♂, July 22, 1938, 5400 feet, cliffs of Pasture Canyon, near Tuba City, Coconino County, Arizona (UU). December 15, 1853, five miles northwest of Winslow (Kennerly and Mollhausen). December 18-20, 1853, on Little Colorado River about 30-35 miles northwest of Winslow near Leupp (Kennerly and Mollhausen). Hargrave reports (1939:208) a part skeleton from each of the ruins of Poncho House, Utah, and Awatovi Pueblo, Arizona, the former probably buried between 700 and 1300 A.D., the latter before 1700 A.D.

Observations: Merriam (1890:91) reports taking an owl of this species at Tanner's Gulch (Pasture Canyon) September 23, 1889, but skin was not saved. Fisher (1903:35) reports hearing it occasionally at Keams Canyon in late July, 1894. Wetherill has many observations recorded, well scattered throughout the year in the Tsegi canyons. Nelson (1909) reported it along his route between Fort Defiance and Lee's Ferry between July 30 and August 26. The expedition records show 4 in June, 22 in July and 3 in August from 1935 to 1938. Monson has a dozen records scattered from March 23 to September 16, in 1936-37-39. Hargrave found one dead near Oraibi in fall of 1937 (?).

Classification: The race of horned owls in the Navajo Country appears to have some individuals which approach *B. v. occidentalis*, some which approach *B. v. pallescens*, and perhaps others that approach *B. v. pacificus*. The one available skin seems clearly referable to *pallescens* because of the light color of its feathers and its wing length measurement (344 mm.). Feathers of all birds seen by the writers have been very pale in color. Among all the birds flushed by day, no dark birds have been observed. However, three specimens from the southwest side of the Little Colorado Valley and areas between it

and San Francisco Mountain, all now at the MNA, were determined by H. C. Oberholser as *pacificus*, and two other specimens from Winslow (USNM 204819) and Oraibi (USNM 299582) were referred to *occidentalis*. Our data are insufficient to determine the limits of each subspecies represented here and it is impossible under the conditions to allocate the observations to them.

Distribution: The horned owl is widely distributed both in area and in altitude. It has been observed or heard, or feathers or pellets found by expedition members in many places from Monument Valley on the northeast to Tuba City area on the southwest, including Kayenta, Marsh Pass, many of the Tsegi canyons and Pasture Canyon. In addition, it has been observed as low as 3500 feet on the San Juan River and as high as 9000 feet on Navajo Mountain. It seems to inhabit either forests or cliffs, and the two habitats appear to enable it to disperse widely over the country. Other observers have found it in many other places well scattered over the area.

Breeding Notes: Monson reports a parent on two eggs in a nest in a large juniper three miles east of Gap Trading Post, March 23, 1937. The young are probably out of the nest before our parties reach the field in June. Russell reports young birds flying over Marsh Pass camp on June 28, and immature birds out of nest have been taken on two different years on July 22.

CALIFORNIA PIGMY OWL . . . *Glaucidium gnoma californicum*

Probably a permanent resident of pigmy forest. **Specimens:** Immature ♀, July 21, 1935, 7000 feet, pigmy conifers in Long Canyon at Ladder House, Tsegi drainage, Navajo County, Arizona (UU). Adult ♀, July 26, 1937, 7000 feet, Betatakin Canyon, Navajo County, Arizona. Taken at 10:30 A.M. from juniper tree with a Hopi chipmunk, head eaten (MNA).

Observations: July 22, 1935, Long Canyon at peach orchard; one seen near spring late in afternoon; appeared very like a starling in flight; lost in pigmy forest (HNR). July 23, 1935, Long Canyon at peach orchard (HNR). October 26, 1937, one seen near Roof Butte in Lukachukai Mountains (GM).

WESTERN BURROWING OWL . . . *Speotyto cunicularia hypugaea*

A breeder of the open flats, nesting in holes in the ground. **Specimens:** Adult ♂, July 14, 1938, 5500 feet, near Kayenta, Navajo County, Arizona (UU). Immature ♂ and adult ♀, July 18, 1938, 6000 feet, open flats of Kletthla Valley, 10 miles northeast of Cow Springs, Navajo County, Arizona (UU).

Observations: Merriam (1890:91) reports this owl found on the higher mesas of the Little Colorado Desert, occupying deserted burrows of prairie dogs. Nelson reported it in July, 1909, six miles east of Winslow, and in August, 25 miles southwest of Chin Lee, near mouth of Keams Canyon and at Tuba City. Skinner saw one near St. Michaels, September 29, 1916. C. T. Black reported one near Tonalea, August 16, 1930. W. P. Taylor saw one 20-25 miles south of Marble Canyon Bridge, August 25, 1931. Gale Monson has eight records ranging from May 6 to September 30 in years 1936 to 1938, at the following places: near Polacca, Hopi Buttes, near Red Mesa Trading Post, near Kaibito and near Tees-Nos-Pas. Hargrave has four records from June 11 to July 31 in 1933 and 1934 near Kayenta and along the road from Kayenta to Tonalea. Russell saw one on the flats south of Navajo Mountain in Arizona, July 29, 1936. Woodbury and Russell have four records be-

tween July 14 and August 12, 1938, in the open valleys from Kayenta to Tuba City.

Breeding Notes: Hargrave reports finding a bird on its nest, presumably incubating, on June 11, 1933. Woodbury reports a family with young out of the nest on July 14, 1938. Both observations were made near Kayenta. On July 18, 1938, we found what appeared to be a colony of these owls near an Indian hogan about ten miles along the road from Cow Springs toward Kayenta. At least 12 birds were counted about 10 to 12 A.M. and probably others were in the holes. We found several holes that appeared from the tracks to be inhabited by the owls. Selecting one of these holes, we attempted to dig the birds out. Following down the steep incline inside the entrance, we found a side-chamber containing some juniper bark (remnant of nest?). Going down farther, we found the hole turned in a spiral and ended in an enlarged chamber at the bottom about six feet underneath the entrance, where we captured two immature birds in their juvenal plumage, without bars in the feathers underneath the body. Other immature birds were seen flying outside the holes. It was suspected that the holes were made by the owls and were not necessarily those of prairie dogs.

MEXICAN SPOTTED OWL . . . *Strix occidentalis lucida*

A breeder, probably a resident at least in the vicinity of Navajo Mountain. **Specimens:** Immature ♂, August 3, 1936, 6500 feet, Navajo Creek Canyon at north foot of Navajo Mountain, San Juan County, Utah. A young bird still with much down on the under parts shot from a tree in a mixed association of firs, pines and Gambel Oak (UU).

Observations: July 28, 1936, 6500 feet, a very large, dark owl probably of this species was flushed in pigmy conifers, one mile northwest of Navajo Mountain Trading Post, San Juan County, Utah (HNR).

Notes: Allan Phillips says, "This is an owl of densely shaded spots, in Canadian Zone and following down along streams where cover is dense enough, in general." The immature specimen was taken in a cover type (firs, pines and oaks) that might indicate Transition Zone, but the observation of a bird questionably assigned to this species was recorded from the pigmy forest. This probably constitutes an extension of range into southern Utah (Woodbury 1939:158).

LONG-EARED OWL . . . *Asio otus wilsonianus*

A resident of the pigmy forest or thickets of brush (breeding not yet known). **Specimens:** February 29, 1936, two miles south of Cow Springs, Coconino County, Arizona; collected by Wetherill who found it dead. Specimens taken near Joseph City, by Don D. Rawson (KU).

Observations: January 21, 1937, Little Colorado River (Long. 111° 17' west, lat. 35° 45' north), one flushed from heavy rabbit brush (no trees for miles) (GM). July 1, 1936, Betatakin Canyon, head of canyon in heavy brush: not definitely identified before because of thick brush (MAW). August 10, 1937, flushed from juniper in Hopi Buttes (GM). September 14, 1936, Betatakin Canyon, Navajo County; seen at head of canyon (MAW).

Note: A bird seldom observed, the Long-eared Owl is doubtless a permanent resident. This is indicated by the records of January, February, July, August and September. It is a bird of thick brush or thick forest, usually in the pigmy conifers or possibly higher.

SHORT-EARED OWL . . . *Asio flammeus flammeus*

This bird is reported on the basis of two recorded observations, one at Keams Canyon by Skinner, September 17, 1916, the other near Egloffstein Butte south of Polacca (20 miles southwest of Keams Canyon), by Monson, September 30, 1938 (1939:167).

SAW-WHET OWL . . . *Cryptoglaux acadica acadica*
(Hypothetical)

Hargrave (1939:208) reports the finding of a feathered foot and part of a tarsus of this bird in the ruins of Kiet Siel Pueblo (cave deposit) probably buried prior to 1300 A.D. No recent records are available, although certain mountain areas appear to furnish suitable habitat.

PACIFIC NIGHTHAWK . . . *Chordeiles minor hesperis*

Probably a migrant. **Specimens:** Female, June 14, 1938, 30 miles east of Holbrook (U. S. highway 66), found freshly dead in road (MNA). Specimen, July 14, 1909, near Winslow (Birdseye). Female, August 17, 1937, 6500 feet, Black Mesa, Arizona; from a flock flying back and forth over a small valley in pigmy forest on a cloudy day about 4 P.M.; same flock from which a specimen of *C. m. henryi* was taken (UU). Specimen, August 18, 1909, at Tuba City by E. W. Nelson.

WESTERN NIGHTHAWK . . . *Chordeiles minor henryi*

A summer resident, probably a breeder. **Specimens:** July 7, 1927, from tree in Tuba City, Arizona (CC). July 10, 1887, on Little Colorado, two miles east of Winslow (Oberholser 1914:69). July 11, 1909, on Little Colorado, two miles east of Winslow (Birdseye). Adult ♂, July 12, 1938, 6600 feet, pigmy forest at Shonto Canyon rim, Navajo County, Arizona (UU). Adult ♂, July 14, 1936, 5900 feet, Kayenta, Arizona (MNA). Adult ♂, July 14, 1936, 10,500 feet, spruce-fir forest, top of Navajo Mountain, San Juan County, Utah, one of a pair flying (UU). ♀, July 16, 1933, 5900 feet, Kayenta, Arizona (MNA). Adult ♂, July 19, 1938, 5800 feet, over open water at Red Lake (Tonalea), Coconino County, Arizona (UU). Skeleton, August 15, 1937, few miles northeast of Cow Springs, Navajo County, Arizona; found dead, killed by car (MNA). Male, August 17, 1937, 6500 feet, pigmy forest, Black Mesa, Arizona, from a flock flying about 4:00 P.M. on a cloudy day (UU).

Observations: Out of 35 records of observations available to us, one occurred in late May, 3 in June, 18 in July, 10 in August and 2 in September. Monson's earliest arrival date is May 28, 1937, and Skinner's latest departure date is September 25, 1916. These records indicate that this nighthawk is present from late May to early or mid-September. L. F. Brady is reported to have found two eggs about August 1, 1934. If this is the correct date, the eggs would seem to represent a second brood. We believe that it must be a widespread regular breeder since it is here all during the breeding season and becomes much more conspicuous and common in August about the time young would be flying. Merriam (1890:92) reported this bird common on the desert of the Little Colorado in August, but not seen in late September.

Distribution: It has been found at many altitudes from the valleys of about 5000 feet up to the top of Navajo Mountain at 10,500 feet. Pre-

sumably it must be widely distributed in breeding as birds have been found at both extremes of altitudes near mid-July. It is widely distributed in area also, having been found by expedition members in surrounding areas in Utah, in the Tsegi canyons, Shonto Canyon and the valleys along the road from Kayenta to Tuba City, and by others at Keams Canyon, Ganado, Fort Defiance and Little Colorado Valley. The birds may be found singly, in pairs or in flocks, the latter usually before or after the breeding season, and usually fly within 2 or 3 hundred feet of the ground. They usually appear about sundown, sometimes earlier, and sometimes remain until after sunrise, occasionally later in the morning. They have been observed on cloudy days as early as 4 o'clock in the afternoon.

Note: It is believed by the writers that the local breeding population, although not quite typical, should be assigned to this subspecies. Migrants probably include other subspecies as well as this, especially *hesperis*.

NUTTALL POOR-WILL . . . *Phalaenoptilus nuttalli nuttalli*

A summer resident, breeding in the pigmy conifers, possibly in the yellow pines and oaks: remaining from April to October.

Specimens: Mid-May, 1858, Fort Defiance (Baird 1861:5). Adult ♀, July 1, 1894, Keams Canyon (Fisher, 1937:35). Adult ♀, July 22, 1936, 6500 feet, cottonwoods, Navaio Mountain Trading Post, San Juan County, Utah (UU). Juvenile, July 29, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau, Kane County, Utah (UU). Juvenile (skin and skeleton), August 3, 1937, 7000 feet, in pigmy forest, Kaiparowits Plateau, Kane County, Utah (UU). Juvenile August 14, 1936, pigmy conifers near Marsh Pass opposite Tsegi mouth (MNA). Adult ♂♂, October 1, 1931, Kayenta-Tuba City road, 15 miles northeast of Cow Springs, Navajo County, Arizona (MNA).

Observations: Among the 22 records of observations available to us from several sources, one occurred in April, 1 in May, 3 in June, 9 in July, 3 in August, 2 in September and 3 in October. Merriam (1890:92) reported observing one bird near Tanner's Crossing on the Little Colorado river (35 miles below Grand Falls) either September 20 or 27, 1889.

Distribution: The poor-will is a common breeder among the pigmy conifers, although it is not often observed because of its crepuscular or nocturnal habits. The birds were common in August on Navaio Mountain among the oaks and ponderosa pines, but we have no evidence that they breed there. Several were found dead along the road in Kletbha Valley on the first of October, but again there is no evidence that they breed there in the valleys. D. J. Hargrave reports that the poor-will was first heard on April 22, 1931, but that it was common by May 1 at Willow Springs near Tuba City. The birds presumably arrive in late April and probably leave in October (latest record October 13) (LLH). It has been found or heard by members of our expeditions on the Kaiparowits Plateau, Navaio Mountain and Beaver Creek Canyon, San Juan County, Utah, and near Marsh Pass, in the Tsegi Canyons, Kletbha Valley, Tuba City area, and some of the mesas in Arizona. Other observers have reported it from Honi Buttes, Keams Canyon, Pinon, Chilchinbito, Eagle Crag and Little Colorado River. A "nest" containing two downy young was found July 23, 1936, in pigmy conifers on the side of Navaio Mountain. A family containing three poorly feathered juveniles out of the nest was found in the pigmy forest on Kaiparowits Plateau, 7000 feet, on July 29, 1937. A similar family was found on August 3 not far away in the sagebrush and oaks.

and a third family on August 12. Presumably the young are flying by August and they spread out a good deal and are much more common thereafter. Perhaps numbers are augmented somewhat during migration—presumably in early October. Our records and observations seem to indicate this bird to be more nocturnal than crepuscular, especially in moonlight.

WHITE-THROATED SWIFT . . . *Aeronautes saxatalis saxatalis*

A common breeding summer resident from early April to late September, obligate inhabitant of the crevices and cracks of high cliffs at all altitudes.

Specimens: Male, July 7, 1927, Blue Valley, Arizona, near Tuba City (CC). Adult ♂ and ♀, July 13, 1938, 6300 feet, cliffs, Shonto Canyon, Navajo County, Arizona (UU). Adult ♀, July 20, 1934, 7000 feet, Water Lily Canyon, Navajo County, Arizona: in flight over pigmy forest (MNA). Adult ♀, July 23, 1936, mixed zones, Skeleton Mesa, head of Dogoszhi Biko, Tsegi Canyons (MNA). July 27, 1937, 7000 feet, high cliffs, Kaiparowits Plateau, Kane County, Utah (UU).

Distribution: This swift is found well distributed over the entire area of the Navajo Country, except the larger valleys where there are no cliffs. It is an obligate inhabitant of cliffs and is peculiarly adapted to that habitat. Since cliffs are so widespread here and so many of them have suitable cracks, the birds are found almost everywhere. It always flies upward into a crack or crevice head first and comes out flying downward head first and out to horizontal on a sweeping arc. Its stiff bracing tail and its short legs and strong claws enable it to cling to the cliff face in the crevice. The crevices or cracks occupied in the cliffs are almost universally well out of reach of man as well as predatory animals. Records of the expeditions include the Kaiparowits Plateau, Navajo Mountain and its contributory canyons, Monument Valley and the San Juan and Colorado rivers in Utah, the Tsegi canyons, Shonto Canyon, Monument Valley, March Pass, Black Mesa, Pasture Canyon and other places in Arizona. Other observers have reported it from Dinnehotso, Chimopovi, Bonito Canyon, Sand Valley, Chin Lee, Keams Canyon, Winslow and other places. Its distribution being correlated almost exclusively with cliffs, it is found at all altitudes from the canyons of the Colorado, 3200 feet, to the cliffs on Navajo Mountain, 9000 feet. It seems equally at home in the 106° temperatures of the Colorado River or the cool breezes at the top of Navajo Mountain.

Breeding Notes: Russell once went over the face of a hundred-foot cliff on ropes at a favorable looking place where birds appeared to be nesting, but as usual the cliff overhung so much he could not reach into the crack. Woodbury found a wide open crack in a cliff in Monument Valley, Arizona, which he climbed about 30 feet to the narrowed top where there were piles of guano several inches thick, but which was not at that time (early July) being used by the swifts. They were visiting higher cracks nearby in many places, apparently nesting. Despite its common and widespread occurrence, we have not been able to obtain a nest, nor determine accurately its nesting conditions. The birds are believed to appear in the spring in early April (8) and leave in September. Monson says they are common in summer. His earliest record is April 9 and latest departure, a flock of 40, on September 25. Wetherill records that they were nesting in Betatakin on May 17 and that there was a "second mating" on June 14. On June 27 one bird which spent 25 minutes at a time at the nest site and was never away more than five minutes was thought to be incubating. On the same date another pair was thought to be nest building. There were no noisy young birds at either of these sites. On July 28 adults

were recorded as feeding young every 20 minutes at an isolated nest. A female taken on July 20 had scarcely passed the breeding condition. Woodbury examined with binoculars a crack in a cliff in Shonto Canyon on July 13, into which several birds had just flown, and could see some of them clinging to the side wall. He took a specimen from among them but could find no evidence of nests or young and concluded it was a roosting crevice. Flocks are recorded from April to mid-June and again from July to September. During July they are often found singly, sometimes in pairs. We have nearly a hundred recorded observations.

BLACK-CHINNED HUMMINGBIRD . . . *Archilochus alexandri*

A summer breeder of the lowlands (below 7500 feet) from June to September, chiefly in Upper Sonoran Zone.

Specimens: Immature ♂, June 24, 1934, 6700 feet, oaks in Water Lily Canyon, Navajo County, Arizona (MNA). ♀, June 28, 1933, 8000 feet, Skeleton Mesa, Navajo County, Arizona (MVZ). Adult ♀, July 4, 1935, 6600 feet, in oaks, Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (UU). ♂, July 6, 1937, 4800 feet, Monument Valley, canyon at Trough Springs, Navajo County, Arizona (UU). Adult ♂, July 6, 1938, 6200 feet, near Marsh Pass, Navajo County, Arizona (UU). Adult ♂, July 6, 1929, Cedar Ridge (USNM). July 7, 1938, 6100 feet, recently used nest under bridge, near Marsh Pass, Navajo County, Arizona (UU). Juvenile ♂, July 9, 1936, 8500 feet, Yellow Pine Forest, War God Spring, Navajo Mountain, San Juan County, Utah (UU). Adult ♂, July 20, 1935, 6800 feet, pigmy forest in Long Canyon at Ladder House, Tsegi drainage, Navajo County, Arizona (UU). ♀, August 4, 1858, Fort Defiance (USNM). Immature ♂, August 6, 1934, 6700 feet, in bee plants at mouth of Water Lily Canyon, Navajo County, Arizona (MNA). Immature ♂, August 18, 1909, Tuba City (USNM).

Observations: Out of seventy observation records, 15 were in June, 30 in July, 23 in August and 2 in September. This is the common hummer of the lowlands, usually below 7500 feet, occasionally higher. Out of 78 records, only one at War God Spring on Navajo Mountain (9000 feet) is over that altitude. It is primarily a bird of the canyons and flowers, seeking nesting sites within the reach of changing blooms. It is well distributed in the desert areas long distances from water, but is perhaps more numerous near it. It is reported in expedition records from Monument Valley, Kaiparowits Plateau, the San Juan and Colorado rivers and from the canyons around Navajo Mountain, in Utah, and Pasture Canyon, Tuba City, Moencopie Wash, Shonto Canyon and several other places in Arizona. It is reported by others from Keams Canyon, Little Colorado River near Winslow and elsewhere. The bird appears to arrive before mid-June and departs probably in September. The males are solitary birds that defend their individual territories. We found a male displaying over a female on July 2, indicating courtship. We also found a nest that had been freshly used and deserted on July 7, and have a young bird on June 24, both of which indicate either a belated or a second courtship on July 2. When the broods leave the nest is not exactly clear, but probably some time before August.

BROAD-TAILED HUMMINGBIRD . . . *Selasphorus platycercus platycercus*

A common breeding summer resident from April to September, especially at altitudes above 7000 feet in the Transition Zone or higher.

Specimens: Female, June 17, 1933, 6000 feet, Tsegi Canyon, 12 miles southwest of Kayenta, Navajo County, Arizona (MVZ). Female, June 26, 1933, 8000 feet, Skeleton Mesa, 17 miles west northwest of Kayenta, Navajo County, Arizona (MVZ). Adult ♀, July 17, 1936, 10,500 feet, aspens, Canadian Zone, top of Navajo Mountain, San Juan County, Utah (UU). Adult ♀, July 18, 1935, 7000 feet, oaks and willows, near head of Long Canyon, Tsegi drainage, Navajo County, Arizona (UU). Adult ♂, July 17, 1936, 10,500 feet, aspens, Canadian Zone, top of Navajo Mountain, San Juan County, Utah (UU). ♀, July 25, 1933, Tsegi-ot-sosie Canyon, 18 miles northwest of Kayenta, Navajo County, Arizona (MVZ). ♀, August 1, 1937, 7000 feet, deciduous shrub, Kaiparowits Plateau, Kane County, Utah (UU). Immature ♂, August 6, 1934, 6700 feet, bee plant association, Water Lily Canyon, Navajo County, Arizona (MNA). Juvenile ♂, August 9, 1935, 8500 feet, ponderosa pine west side of Navajo Mountain, San Juan County, Utah (UU).

Observations: The earliest record available is April 17, 1937, when Monson observed three near Copper Mine about 30 miles west of Kaibito. Of the records available, 4 occurred in April, 2 in May, 2 in June, 13 in July, 5 in August. Reliable records extend to August 14, but questionable records reach into early September. Monson reports it in numbers at Keams Canyon from May 5 to August 13, but these are probably not the limits of its stay there.

Distribution: This hummingbird is well distributed over the area in the cooler, moister parts of the higher altitudes but it is not generally found in the warm dry valleys and unwatered canyons. It has been taken or observed on Navajo Mountain, Kaiparowits Plateau, several of the mesas and many of the canyons, and appears to live in the spruce-fir forest, the aspens, the yellow pines and the oak chaparral. The bee plants, *Cleome*, seem to be the favorite food plants when in bloom, as they are with other hummingbirds, but they are often seen at Indian Paint Brush flowers also. The limits of its stay in the region are indicated by observations from April 17 to September, but there may be stragglers here before and after those limits. Its common occurrence between those dates suggests that it is a common breeder despite the sparsity of breeding records. The young appear to mature about early or mid-July; the first young was seen out of nest July 11 and two well grown young in nest were observed July 12 but had left on July 13; females as well as young become common thereafter until they leave in August or September.

RUFIOUS HUMMINGBIRD . . . *Selasphorus rufus*

The Rufous Hummingbird is an abundant migrant through the region all during July and August, stragglers lingering into September and frequenting areas where flowers, especially the bee flowers. *Cleome*, are in bloom, and in nearly all altitudes from 5300 feet up.

Specimens: Adult ♂, July 11, 1936, 9500 feet, limber pine and fir association, near top of Navajo Mountain, San Juan County, Utah (UU). ♂, July 13, 1909, Little Colorado River, two miles east of Winslow (USNM). Adult ♂, July 17, 1936, 10,400 feet, aspens, top of Navajo Mountain, San Juan County, Utah (HNR). ♂, July 30, 1894, Keams Canyon (USNM, Fisher 1903:35). Adult ♂, August 1, 1935, bee flowers, lowest side canyon, Tsegi drainage, Navajo County, Arizona (UU). Immature ♀, August 4, 1934, 6800 feet, bee flowers, Water Lily Canyon, Navajo County, Arizona (MNA). ♀, August 7, 1937, 7000 feet, deciduous shrub, Kaiparowits Plateau, Kane County, Utah (UU). August 7, 1937, 7000 feet, deciduous shrub, Kaiparowits Plateau, Kane County, Utah (UU). ♀, August 9, 1937, 7000 feet,

deciduous shrub, Kaiparowits Plateau, Kane County, Utah (UU). Adult and juvenile ♂♂, August 9, 1935, 8500 feet, ponderosa pine, southwest side of Navajo Mountain, San Juan County, Utah (GC and UU). Adult ♂, August 13, 1936, bee flowers, Tsegi Canyon, one-half mile above mouth, Navajo County, Arizona (MNA).

Observations: June 28, 1938, one mile south of Marsh Pass, a single adult ♂ in the pigmy forest (HNR). June 30, 1938, 1 mile east of Marsh Pass an adult ♂ chased by an *Archilochus* (HNR). Nelson (1909) found a few birds of this species on the Little Colorado River near Winslow, July 11-23 found it along the way from Fort Defiance to Lee's Ferry, July 31 to August 26, especially at Keams Canyon August 9, and Tuba City August 14-20. Goldman saw several at Chin Lee August 17, 1917. Monson saw birds at Keams Canyon August 28, 1937, and August 13, 1938. Expedition records well distributed from late June (28) to mid-August (13) include 2 in June, 17 in July and 11 in August.

Distribution: This bird has been observed in migration during July and August in many places extending from Tuba City to Kaiparowits Plateau but mostly at altitudes above 5300 feet. When and if it migrates northward through July and August, although it is not clear whether this is due to lingering arrivals in numbers on their way south, the adult males first, usually beginning the first week in July, although this date may vary from year to year. By mid-July they are abundant in all altitudes. The migration wave continues through the region is not clear. It appears to be absent during late spring, but through July and August, although it is not clear whether this is due to lingering of the first comers or to continual replacement by new arrivals. By mid-August (13) they are gone from the higher altitudes but are still to be seen in the lower canyons.

CALLIOPE HUMMINGBIRD . . . *Stellula calliope*

A sparse migrant through the area during the time that the Rufous Hummingbird is migrating. **Specimens:** Immature ♂, August 4, 1934, 6850 feet, bee flowers in Water Lily Canyon, Navajo County, Arizona (MNA). Immature ♂, August 18, 1938, 6300 feet, bee flowers in pigmy conifers, Marsh Pass, Navajo County, Arizona (UU).

Observations: August 7, 1934, Dogoszhi Biko, not common (RT). August 10, 1934, Dogoszhi Biko, adult ♂ in bee plant (RT).

Distribution: A bird that is probably overlooked in the great flood of hummingbird migrants of late summer. The August 4 specimen was secured accidentally, but the August 18 bird was identified because it was forced to retreat consistently before the attacks of several young rufous hummingbirds. It is very likely a regular though sparse migrant despite the inadequacy of our records. Although our records all come from the canyons country, it is not to be supposed that it is limited to that portion of the area.

WESTERN BELTED KINGFISHER . . . *Megasceryle alcyon caurina*

Sparse migrant. **Specimens:** Adult ♀, August 20, 1938, 5300 feet, trees bordering Tuba City Reservoir, Coconino County, Arizona (UU). **Observations:** Merriam (1890:92) reported seeing a lone bird at Tanner's Gulch (Pasture Canyon), September 23, 1889. Monson saw one at Dinnehotso, September 25, 1936.

Remarks: We found no evidence to indicate that this bird was a resident of this region, even though we looked for it along the rivers and streams. The records available seem to indicate southward migration.

RED-SHAFTED FLICKER . . . *Colaptes cafer collaris*

A permanent resident and breeder in the wooded portions of the Navajo Country. **Specimens:** ♂, April 21, 1892, Noland's Ranch, near 4-corners on San Juan River, Utah, by C. P. Rowley (AMNH). ♂♂, April 24, 1892, Riverview, San Juan River, Utah, Rowley (AMNH). ♂, May 25, 1892, Bluff, San Juan River, Utah (AMNH). Immature ♀, June 23, 1934, 6200 feet, Douglas fir trees, Dogoszhi Biko, Navajo County, Arizona: bird nearly grown (MNA). ♂, June 26, 1927, Whiskey Creek on west slope Tunicha Mountains, 6500 feet, Cantwell (USBS). Nestling, July 16, 1938, 7500 feet, from nest in dead yellow pine on Black Mesa, near Coal Mine, Navajo County, Arizona (UU). Adult ♂, July 22, 1936, 8500 feet, ponderosa pine on southeast bench of Navajo Mountain, San Juan County, Utah (UU). Juvenile, half-grown, July 26, 1935, 6000 feet, Betatakin Canyon, Tsegi drainage, Navajo County, Arizona (MNA). Immature ♂, August 5, 1934, 6700 feet, pigmy conifers in Dogoszhi Biko, Navajo Mountain, Arizona (MNA). Adult ♂, August 10, 1935, 9500 feet, spruce-fir forest, Navajo Mountain, San Juan County, Utah (MNA). Mummified specimen, probably buried prior to 1300 A.D., taken from Betatakin ruins (Hargrave 1939:209).

Observations: Loring reported it common among the cottonwoods along the San Juan River, Utah, near Bluff, November 8-15, and Noland's Ranch November 19, 1893. Nelson observed this bird near Winslow, Fort Defiance and Oraibi in July and August, 1909. Skinner saw it near Ganado, Chin Lee and St. Michaels, September 20-30, 1916. Goldman saw it in Canyon del Muerto and Spruce Creek in Tunicha Mountains, August 19 to 21, 1917. Wetherill noted this Flicker in Betatakin canyon on many dates of each month from March to October, spread over the years from 1934 to 1936. Jenks reported it near St. Michaels, Fort Defiance and Chi Dodge, June 20 to 24, 1933. Our expeditions have more than 50 records of observations, 12 of which occurred in June, 31 in July and 7 in August, mostly in the Tsegi canyons and Navajo Mountain. Monson (1937a:67) found it on the Tuba Christmas census, December 19, 1936, and also reported it "seen throughout the year in wooded portions" of Navajo Country.

Distribution: This bird is well distributed as a breeder through all the forests of the area, although much more sparsely in the juniper-pinons than in the yellow pines, spruces and firs. It is known to range in altitude from 5000 to 10,500 feet. Available records show that it has been commonly observed from March 1 to October 31, many times in each month, and that it is a winter visitant to the deciduous trees of the Tuba City region. There appears to be some migrational movement, probably altitudinal in character.

Breeding Notes: Its nesting holes have been observed in oaks, junipers, ponderosa pines and firs. Hargrave reports five nestlings as early as June 17, and Monson a nest in juniper containing half grown young, June 24. Wetherill reported two young birds leaving the nest in an oak by June 26, but Woodbury found four fledglings ready to leave the nest in a dead yellow pine as late as July 16. Birds freshly out of the nest were found as early as June 23 and as late as August 5.

Classification: Specimens examined appear to fall in the check list subspecies *C. c. collaris*, but according to Brodtkorb's study they would fall in the group he designates as *C. c. canescens*, the Great Basin Red-Shafted Flicker.

WESTERN PILEATED WOODPECKER . . . *Ceophloeus pileatus picinus*

There is a specimen of this bird in the collection of Dr. Leonard C. Sanford in the American Museum of Natural History taken by Rowley, May 21, 1892, at Bluff, San Juan County, Utah.

MEARNS WOODPECKER . . . *Balanosphyra formicivora aculeata*

Locally common permanent resident on Defiance Plateau and Lukachukai Mountains in oak chaparral and pine forest; may be straggler elsewhere. **Specimens:** ♂, July 31, 1909, among oaks on Defiance Mountain 15 miles northwest of Fort Defiance (Nelson, USBS). Immature ♂, July 23, 1936, in pigmy conifers intermixed with oaks about four miles up Tsegi Canyon, Arizona (MNA).

Observations: Nelson found the bird "rather common" in the oak shrub on Defiance Mountain in late July, 1909. Skinner reported observing a bird likely of this species which he called *Melanerpes erythrocephalus* in the pines 30 miles east of Chin Lee, September 27, 1916. He also reported observing in the pines on the same day 10 birds and the previous day six birds which he called males of *Sphyrapicus thyroideus nataliae*, but which were probably of this species, of whose presence he seems to have been unaware. *S. t. nataliae* usually inhabits the spruce-fir forests and would be out of place among the pines. Gale Monson has many observations well distributed through the year as follows: Fort Defiance Plateau, from 1 to 3 birds on the following dates: January 25, 1939; February 10, 1938; June 10, 1938; August 11 and 13, 1938; and larger number on the following dates: 12 on October 1, 1936; 18 October 7, 1936, and 5 October 8, 1936; Tsaile, one observed June 23, 1938; Roof Butte in Lukachukai Mountains, 3 on June 24, 1938; one October 20, 1937; 4 on October 26, 1937.

Comment: Russell thinks this bird is always found in mixed oaks and pines and always in groups which appear to occupy the same small locality for years on end, while exactly similar country for miles about has none of them. The Tsegi Canyon specimen, July 23, 1936, was a lone straggler. No others have been observed in this region. It is interesting to note that Nelson, Skinner and Monson all found it at the same place through a spread of 29 years.

LEWIS WOODPECKER . . . *Asyndesmus lewis*

Summer resident in the mountains of eastern edge of Apache County, perhaps straggler elsewhere. **Specimens:** ♂, July 31, 1909, at edge of pine forest near sawmill 15 miles northwest of Fort Defiance (Nelson USBS). ♀, June 21, 1927, summit of Lukachukai Mountains, 8000 feet, 15 miles east of Lukachukai School (Cantwell). ♀, June 26, 1927, Wheatfield Creek, 7000 feet, west side of Tunicha Mountains (Trapier). ♂ and ♀ ♀, June 26, 1927, Whiskey Creek, 6500 feet, Tunicha Mountains (Cantwell and Trapier).

Observations: Monson has the following records: May 7, 1937, one at Keams Canyon; June 9, 1938, two near Fort Defiance; June 23, 1938, one at Wheatfields; August 20, 1938, four at Roof Butte, Lukachukai Mountains;

October, 1, 2, 1936, six and one at Sawmill; October 7, 1936, 20 near St. Michaels; October 26, 1937, four at Roof Butte.

RED-NAPED SAPSUCKER . . . *Sphyrapicus varius nuchalis*

Summer resident in pine and spruce-fir forests of Navajo Mountain. Migrant in spring (March 23) and fall (Sept.-Nov.) in lower forests. *Specimens:* Adult ♀, July 23, 1936, 8500 feet, in willows at War God Spring, Navajo Mountain, San Juan County, Utah (UU). Adult ♂, September 20, 1936, 6800 feet, Betatakin Canyon, Navajo County, Arizona (MNA). Adult ♂, skin and part skeleton, September 24, 1937, 7000 feet, Betatakin Canyon, Navajo County, Arizona; Transition Zone (MNA). Adult ♂, October 27, 1931, near Bluff, San Juan County, Utah (UU).

Observations: March 23, 1937, in pigmy conifers 10 miles east of Gap Trading Post (Monson). July 4, 1936, a ♂ in the pines above War God Springs, Navajo Mountain, San Juan County, Utah (HNR). July 11, 1936, War God Springs, Navajo Mountain, San Juan County, Utah: fresh working in willows below the spring (HNR). July 13, 1936, near top of Navajo Mountain, San Juan County, Utah, Canadian Zone, fresh working in a limber pine (HNR). July 23, 1936, War God Springs, Navajo Mountain, San Juan County, Utah: Transition Zone; fresh workings increasing in number (HNR). August 23, 1917, near Roof Butte, Tunicha Mountains, 9000 feet, noted by Goldman. September 20, 21, 22, 30, 1936, Betatakin Canyon, two pairs seen the first day—recorded other days (MAW). September 23, 1889, Merriam (1890:92) observed one at Moa Ave (near Tuba City). September 29, 1938, a ♂ observed in Betatakin Canyon (Wetherill). October 1-12, 14, 21, 22, 1936, Betatakin Canyon, one or two pairs seen daily (MAW). September 30 and October 1, 1936, at Sawmill, one each day (Monson). October 12, 1938, two at Keams Canyon (Monson). November 8, 1938, one at Pinon (Monson).

Comments: The data here suggest that the bird is a breeder of the coniferous forests of the mountain tops especially among the aspens. The dates of its stay there are not clearly indicated but probably extend through July and August, perhaps earlier and later. Some of the September, October and November records come from areas of lower altitudes containing cottonwoods or pigmy conifers which it visits in migration. Wetherill's records at Betatakin indicate that it appeared there in the latter part of September and remained through most of October.

NATALIE SAPSUCKER . . . *Sphyrapicus thyroideus nataliae*

Probably breeder and migrant. *Specimens:* ♂, June 20, 1927, from Lukachukai Mountains, summit 8000 feet, 15 miles east of Lukachukai School (Cantwell, USBS). ♂, April 27, 1927, Riverview on San Juan River, Utah (AMNH). **Observations:** October 14, 1936, one seen along White Water Creek south of Lupton and south of Rio Puerco (GM).

WHITE-BREASTED WOODPECKER . . . *Dryobates villosus leucothorectis*

Permanent resident of forests at all altitudes with perhaps some vertical migration. *Specimens:* Adult ♀, March 24, 1934, 6000 feet, Marsh Pass, Navajo County, Arizona (MNA). Specimen, mid-May, 1858, Fort Defiance (Baird 1861:5-6). Adult ♂, June 16, 1934, 6000 feet, pigmy conifers at Marsh Pass, Navajo County, Arizona (MNA). ♂, June 24, 1927, Wheat-

field Creek, Tunicha Mountains, 7000 feet (Cantwell, USBS). Adult ♂, July 5, 1935, 7000 feet, pigmy conifers, Long Canyon, Tsegi Drainage, Navajo County, Arizona (UU). Immature ♀, July 6, 1936, 8500 feet, near Soldiers Ssep, Navajo Mountain, San Juan County, Utah (UU). Immature ♂, July 15, 1935, pigmy conifers, mesa west of Bubbling Springs Canyon, 7200 feet, Tsegi drainage, Navajo County, Arizona (UU). Adult ♂, July 16, 1936, 10,000 feet, spruce-fir forest near top of Navajo Mountain, San Juan County, Utah (UU). ♀, August 2, 1909, 20 miles northwest of Fort Defiance (Nelson, USBS). Immature ♂, August 2, 1934, 6800 feet, pigmy conifers, Water Lily Canyon, Tsegi drainage, Navajo County, Arizona (MNA). Skeleton, August 11, 1934, mixed zones, head of Dogoszhi Biko, Tsegi Canyon, Navajo County, Arizona (MNA). Adult ♀, August 13, 1935, 9000 feet, ponderosa pines near War God Spring, Navajo Mountain, San Juan County, Utah (UU). September 3, 1934, adult ♂, pigmy conifers, three miles west of Betatakin, Navajo County, Arizona, 7200 feet (MNA).

Observations: Kennerly and Mollhausen found it on the Little Colorado, one or two miles east of Winslow on the Pacific RR survey, December 8, 1853, and Mollhausen found it on the Ives Expedition about mid-May, 1858, near Fort Defiance, which may mean any place on the route through the Navajo Country. Fisher (1903:35) reported it at Keams Canyon in the latter part of July, 1894. Nelson found it in Bonito Canyon and in the pine-oak forest, 15-25 miles northwest of Fort Defiance, August 1, 1909, and in the pigmy conifers near Eagle Crag, August 7 of the same year. Skinner found two in the pines 20 miles east of Chin Lee, September 26, 27, 1926. Goldman noted it at Roof Butte, Tunicha Mountains, August 23, 1917. Jenks reported it June 22, 1933, from a natural bridge five miles southwest of Fort Defiance and June 24 from Chi Dodge, 20 miles north of Fort Defiance. Wetherill noted it at Betatakin, March 13, 22, 25, 29, April 6 and 11, May 7, 8, 28-31, June 1-3, 6-11, 28, July 14, August 25, October 1-18, 1935, in addition to other similar records in September and October in 1934 and 1936, and other similar records in Kiet Siel Canyon. It was observed in the pigmy conifers on the mesa as well as the pocket of larger conifers and aspens in Betatakin Canyon. Benson (1935:445) found three in the forests on Navajo Mountain, June 13-20, 1933. Monson says he has records over the entire reservation in the Upper Sonoran and Transition woodland well distributed through the entire year (1936-1939). Our expeditions have nearly 50 records distributed mainly through the months of June, July and August, chiefly from Navajo Mountain region in Utah and from the Tsegi drainage in Arizona.

Distribution: This bird seems to be well distributed though widely spaced through the pigmy conifers, but has a denser population in the yellow pine and spruce-fir forests of higher altitudes. It ranges in altitude approximately from 6000 to 10,000 feet. It has not been observed and probably does not occur in the lower altitudes along the San Juan and Colorado river valleys, but has been observed in several isolated forest areas in nearly all parts of the Navajo country in both Utah and Arizona above 6000 feet. It is believed to be a resident breeder even though no nests have been encountered. Three immature birds taken from July 6 to August 2 indicate that the young are grown by midsummer.

Classification: The uniformly small feet and the white underparts indicate that our specimens belong to this subspecies despite the large white spots on the tertials of some of the specimens.

BATCHELDER DOWNY WOODPECKER . . . *Dryobates pubescens leucurus*

Sparse breeder; principally a migrant; probably sparse winter resident.
Specimens: Adult ♂ and ♀. October 9, 1936, 6800 feet, Betatakin Canyon, Navajo County, Arizona (MNA).

Observations: February 2, 1938, Chin Lee, one in cottonwoods (GM). March 22, 1935, Betatakin Canyon, "This woodpecker was in last fall, and I have seen it several times this spring." (MAW). April 6, 1935, Betatakin Canyon, noted (MAW). May 7, 1937, Keams Canyon, ♂ in cottonwoods (GM). May 29, 1937, Betatakin Canyon (LH). September 29, 1935, Betatakin Canyon, one seen (MAW). October 1-13, 1934, Betatakin Canyon, daily, one or two (MAW). October 6, 1936, near St. Michael's, one observed (GM). October 7, 8, 1936, Betatakin Canyon, recorded (MAW). October 10-14, 23, 25, 1936, recorded as seen at Betatakin Canyon (MAW). October 12, 16-21, 23, 26, 27, 1935, Betatakin Canyon, two seen each day (MAW). October 23, 1934, Betatakin Canyon, two seen (MAW).

Notes: This bird appears to be mainly a migrant, since the records are bunched in spring and fall. Wetherill remarks that the birds were "just passing through" in connection with some of the spring records, but he also commented that in 1935 one pair stayed and nested near Betatakin ruins. The young were seen in July. It is probably only a casual or sparse breeder. Streator (USBS) saw a few "*Dryobates*" about Holbrook and Winslow in cottonwoods between April 19 and May 7, 1893. These undoubtedly refer to this species, but were placed under *Dryobates scalaris cactophilus* in the USBS files and are doubtless the basis of the record for that species given by Oberholser (1911:153) at Holbrook, Arizona.

EASTERN KINGBIRD . . . *Tyrannus tyrannus*

Rare or casual. *Specimen:* Russell picked up a bird June 14, 1938, killed within a few days, on U. S. highway 66, about 20 miles west of Holbrook, which was preserved as a mummy (MNA).

Observations: Fisher (USBS) reports that W. W. Price had seen a pair of birds at Holbrook in August, 1894, but Fisher failed to find it himself July 15-17 nor August 4-8, 1894 (Fisher 1903). One was observed by Hargrave (1936b:171) and several other people at Wetherill's Ranch, Kayenta, June 13, 1933. It was not there in mid-July.

ARKANSAS KINGBIRD . . . *Tyrannus verticalis*

A summer resident, from April to September, inhabiting most of the valleys up to 6500 and possibly 7000 feet—confined almost exclusively to deciduous trees, especially cottonwoods.

Specimens: ♂, April 26, 1892, Riverview on San Juan River (AMNH). Adult, April 29, 1935, near Bluff, Utah (UU). Adult, July 6, 1936, two miles southwest of Tuba City, Arizona (MNA). ♂, May 7, 1903, near Adamana, on Rio Puerco (L.A.F. 932, at Cornell Univ.). July 22, 1937, 3300 feet, streamside trees, Rock Creek, Colorado River (UU). Adult ♀, July 28, 1935, 6400 feet, pigmy forest, Long Canyon, Tsegi Drainage, Navajo County, Arizona (UU). ♀, August 2, 1894, Keams Canyon, Arizona (Fisher, USBS). August 13, 1937, 7000 feet, willows, Kaiparowits (UU). Immature ♀, August 17, 1936, 4000 feet, cottonwoods and willows, East Gypsum Drainage, Monument Valley, San Juan County, Utah (UU). Adult ♀, August

22, 1934, sagebrush 20 miles west of Kayenta, Navajo County, Arizona (MNA).

Observations: Rowley found it on the banks of the San Juan River, Utah, near Riverview in April, 1892. Fisher (1903:35) found it at Holbrook and Keams Canyon, Arizona, in July, 1894. Chapman (1903:99) observed it in the cottonwoods near Adamana on the Rio Puerco, Arizona, May 7, 1903. Nelson in 1909 found it abundant in family flocks at Winslow, Arizona, July 11, saw it at Holbrook, July 25-27, observed a few in Defiance Valley, July 30-31, a few at Keams Canyon, August 9, a few about Tuba, August 14-20, and a few at Lee's Ferry, August 23-24, but not on 25-26. Benson did not find it in his reconnaissance of Navaio Mountain, June 10-26, 1933. The University of Utah expedition of 1935 found it along the San Juan River in Utah near Bluff, April 29. Wetherill has an early record, April 12, 1936, of two birds seen at Betatakin Canyon, Tsegi drainage. While this is unusually early, there are still earlier records farther north in Utah and he has records of Cassin Kingbirds the next month, indicating that he could distinguish the two. Phillips found it rather common in the cottonwoods around Tuba City, Moencopie Wash and Pasture Canyon, July 2-9, 1936. Monson has 13 records extending from May 17 to September 13, in the years 1937-38, from the following places: Jeddito, Keams Canyon, Polacca, Oraibi, Hopi Buttes, Cow Springs, Kayenta and Red Lake north of Fort Defiance. Our R.B.-M.V. expeditions have yielded about 27 records ranging from June 24 to September 7 most of them in July and August. It has been observed in practically all altitudes from 3100 feet (Lee's Ferry) to 7000 feet (Kaiparowits Plateau), and in the following locations: Several places along the banks of the San Juan and Colorado rivers, East Gypsum Wash in Monument Valley, Kayenta vicinity, near Marsh Pass, Cow Springs, and Pasture Canyon near Tuba City.

Discussion: The Arkansas Kingbird occupies a habitat which usually includes deciduous trees or brush. Its association with streamside forest of cottonwoods and willows is striking and it is mainly limited to deciduous trees near water during the breeding period, May to July, but may wander afield afterward. Migration appears to occur mainly in May and August (earliest April 12, latest September 13). Monson saw one building a nest in a cottonwood near Oraibi, May 24, 1937. Phillips found it breeding near Tuba City, July 2-9, 1936. Woodbury and Russell found adults feeding young out of the nest in the same general area, July 20, 1938.

CASSIN KINGBIRD . . . *Tyrannus vociferans vociferans*

A summer resident from May to August, inhabiting the canyons, valleys and foothills wherever trees are available and most commonly along the edges of the pigmy conifers (3300-7000 feet). **Specimens:** Adult ♂♂, July 2, 1935, 6400 feet, pigmy conifers in Bubbling Springs Canyon, Tsegi Drainage, Navajo County, Arizona (UU). Adult ♂, July 5, 1938, 6700 feet, pigmy forest, near Marsh Pass, Navajo County, Arizona (UU). ♀, July 12, 1937, 4500 feet, desert brush in Arizona three miles south of Oljato, Utah (UU). ♀, July 13, 1937, 4500 feet, cottonwoods at Oljato, Utah (UU). Adult ♂, July 14, 1933, 5900 feet, Kayenta, Arizona (MNA). Nest and nestling ♀, July 20, 1938, 5500 feet, juniper at edge of pigmy forest 15 miles northeast of Tuba City, Coconino County, Arizona (UU). July 26, 1937, 3300 feet, oaks, Colorado River near Rock Creek (UU 5231). Adult ♂ skeleton, July 31, 1934, 6300 feet, mouth of Kiet Siel Canyon, Tsegi drainage, Navajo

County, Arizona (MNA). August 13, 1937, 7000 feet, chaparral, Kaiparowits Plateau (UU).

Observations: This bird seems to have been missed by the early explorers. Nelson in 1909 found the bird "rather common" in families in Winslow July 11 and at Holbrook July 25-27. Along his route he found it "common" in the ponderosa pines of Bonito Canyon and Sawmill and in the pigmy conifers at Fort Defiance, Eagle Crag, Keams Canyon, Tuba City and Cedar Ridge. Goldman saw it in 1917 in cottonwoods at Chin Lee August 17 and on the wall of lower Canyon del Muerto, August 18. Hargrave saw a pair nesting in the same cottonwood tree as pair of Red-tailed Hawks, four or five miles south of Oraibi in the summer of 1932. Benson did not find it in his reconnaissance of Navaio Mountain June 10-26, 1933, and Russell did not find it there in 1936. Phillips saw several daily in the region around Tuba City, July 2-9, 1936. Wetherill has a couple of May records (4, 19) from Kiet Siel Canyon, Tsegi drainage. Monson regarded it as common in summer over the entire reservation, principally in the Upper Sonoran Zone. His earliest record was May 5, 1937, when he saw seven at Keams Canyon. The R.B.-M.V. expeditions have 52 records during June and July over a period of six years, and only one in August but none in September. This is probably not due to their absence, because other observers have found them during these later months.

Discussion: Nelson reported this bird among the ponderosa pines, but most other observers have found it in trees or open forests of lower altitudes. Unlike the Arkansas Kingbird, which is mainly limited during the breeding season to the streamside deciduous trees, the Cassin spreads out into the pigmy conifers as well, where the forest is not too thick, particularly at the edges. The same habitat seems to serve after the young are reared and in migration. It is less common in the cottonwoods than the Arkansas Kingbird.

The lowest altitude record we have is about 3300 feet from the Colorado River near the mouth of Rock Creek and the highest about 7000 feet on Kaiparowits Plateau. Most of the records come from altitudes of 5000 to 6000 feet. On our trip down the San Juan and Colorado Rivers, in July-August, 1938, it was not observed at all.

Breeding Notes: Russell discovered a nest in a pinyon pine containing young, July 1, but out of nest, July 7. Monson found young just out of nest at Keams Canyon as early as June 24, 1937. Nestlings nearly feathered were found in a nest in a juniper tree five feet up on a horizontal limb in the lower edge of the pigmy forest between Red Lake (Tonalea) and Tuba City on July 20, 1938, which must have left the nest within a few days. The young are probably flying by late June or early July. The bulk of migration seems to occur in May and August, but some linger into September.

SCISSOR-TAILED FLYCATCHER . . . *Muscivora forficata*

The appearance of an adult ♂ of this species in moulting condition in the trees around the Wetherill home at Kayenta in midsummer must have been accidental since it is outside of its known usual range. No other records are available (Hargrave 1936a:120).

Specimen: Adult ♂, July 8, 1934, 5800 feet, deciduous trees at Kayenta, Navajo County, Arizona (MNA).

ASH-THROATED FLYCATCHER . . . *Myiarchus cinerascens cinerascens*

A summer resident from April to August, inhabiting the lower and medium altitudes (3100-7200 feet) but seeming to prefer the rough country, especially small canyons and washes with sparse or medium tree or brush cover, or with ledges or small cliffs.

Specimens: April 24, 1892, Riverview on San Juan River, Utah (AMNH). May 7, 1903, Adamana, Arizona (L.A.F.). ♀, egg almost formed in ovary, June 21, 1933, five miles southwest of Fort Defiance (U. Ariz.). June 23, 1933, Seeg-ot-sosie Canyon, 18 miles northwest of Kayenta, Navajo County, Arizona (MVZ). Adult ♂, June 25, 1934, 6700 feet, pigmy conifers, Dogoszhi Biko, Navajo County, Arizona (MNA). Adult and immature ♂, July 3, 1937, cottonwoods, Monument Valley, 4500 feet, Utah (UU). Adult ♀, July 4, 1935, pigmy conifers in Bubbling Springs Canyon, 6400 feet, Tsegi Drainage, Navajo County, Arizona (GC). ♂, July 7, 1937, desert brush, Monument Valley, 4500 feet, Utah (UU). Adult ♂, July 12, 1934, Water Lily Canyon, Navajo County, Arizona (MNA). Three ♂, July 12, 1937, 4500 feet, pigmy forest, Goulding (UU). Adult ♂ and ♀ and immature ♂, July 13, 14, 1935, pigmy forest on mesa top, west of Bubbling Springs Canyon, Navajo County, Arizona, 7200 feet; adult ♂, testes greatly enlarged; adult ♀, ovary enlarged (GC). Adult ♂, July 19, 1936, oaks, Water Lily Canyon, Tsegi Canyon (MNA). ♂, July 20, 1909, Winslow, Arizona (Birdseye, USBS). ♂♂, July 21-26, 1937, canyon shrubs, Rock Creek, Kane County, Utah, 3300 feet (UU). Two adult ♂, July 27, 1936, pigmy forest, 6000 feet, three miles north of Navajo Mountain Trading Post, San Juan County, Utah (UU).

Observations: Fisher observed it at Keams Canyon, July 17-31, 1894 (1903:35). Nelson and Birdseye found it in 1909 at Winslow, July 16-20, near Chin Lee, August 3-7, at Eagle Crag, August 7, at Keams Canyon, August 8; and 18 miles west of Oraibi, August 12, where he saw a family out of the nest. Jenks reported it in 1933 from five miles southwest of Fort Defiance, June 21, from Canyon de Chelly and Canyon del Muerto, June 23, and from Keams Canyon, June 26. Benson (1935:422) found it in Bridge Canyon north of Navajo Mountain, San Juan County, Utah, June 21-24, 1933. Wetherill has an April 29, 1936, record from the Tsegi Canyon, a record of several pairs seen in Kiet Siel Canyon, May 4, 1936, and records from Betatakin and Kiet Siel canyons, May 8, 1935. Phillips reported it in 1936 from the Tuba City region at Kerleys Trading Post in poplars July 6, and near the Tuba City reservoir July 9. Monson found it "occasional" in the pigmy conifers. His extreme records range from May 6 to August 13, in the years 1936-39. The R.B.-M.V. expeditions 1933-38 have about 60 records extending from June 17 to August 18.

Distribution: It has been observed by our expeditions in many places along the Colorado and San Juan rivers, in Monument Valley, near Kayenta, near Marsh Pass, Kletthla Valley, Tsegi Canyon and its branches, Pasture Canyon and around the base of, but not on, Navajo Mountain. It is apparently well distributed over the altitudes below 7200 feet, but seems to prefer the rough country with small canyons, washes or side canyons, usually with ledges, or sparse to medium cover of trees or brush. Other observers found it in additional places: along Little Colorado River, near Fort Defiance, near Chin Lee, in Canyons de Chelly and del Muerto, Keams Canyon, near Oraibi and Tuba City. It is widely distributed through the canyons and foothills in pigmy conifers and shrubbery.

Breeding Notes: It appears to be nesting during late June and early July. Notes of specimens indicate that males taken June 25, July 13 and July 19 had enlarged testes. The June 21 ♀ was in egg-laying condition. Monson reported a nest containing young in a bird house at Keams Canyon, June 24, 1937. One was noted by Russell, July 5, 1938, carrying food, and a pair that had been noted several times near Marsh Pass Camp (6200 feet) were observed to have young out of the nest on July 8. However, an immature out of the nest was taken for a specimen in Monument Valley (4500 feet) as early as July 3. Nelson found families still together as recognizable units out of the nest as late as August 3 and 12, 1909. They appear to scatter a great deal after leaving the nest.

NORTHERN BLACK PHOEBE . . . *Sayornis nigricans semiatra*

Summer resident near Winslow (1909); apparently a transient visitor or post-breeding wanderer elsewhere in August and September. **Specimens:** July 1909, near Winslow, Arizona (Birdseye, USBS). **Observations:** July 11-25, 1909, "found very sparingly on Little Colorado River near Winslow" (Nelson). August 14-20, 1909, "several about ponds near Tuba City" (Nelson). August 23-26, 1909, observed one at Lee's Ferry (Nelson). August 27, 31, 1934, observed at Betatakin Canyon (MAW). September 3, 1936, near Betatakin Canyon (MAW).

SAY PHOEBE . . . *Sayornis saya saya*

One of the most common and characteristic breeding birds of the Navajo Country, coming during the latter half of March and remaining at least until late September: inhabiting all the desert valleys and canyons up to 7000 feet, occasionally higher, sometimes reaching 9000 feet. It winters sparingly in the lower altitudes.

Specimens: April 19-May 23, 1892 at Noland's Ranch, Riverview and Bluff on San Juan River, San Juan County, Utah (AMNH). Adult. April 28, 1935, near Bluff, Utah (UU). Adult ♂. May 11, 1935, near Bluff, San Juan County, Utah (UU). Adult. June 30, 1935, 6400 feet, rabbit brush flats, Bubbling Springs Canyon, Tsegi Drainage, Navajo County, Arizona (GC). Skeleton ♀ and two skins, 1937, 4500 feet, desert brush, Monument Valley, Arizona (UU). Immature ♂, July 7, 1936, pigmy forest, 9000 feet, on exposed rocky west slope of Navajo Mountain, San Juan County, Utah (UU). Adult ♀, July 8, 1935, 6400 feet, Bubbling Springs Canyon, Tsegi Drainage, Navajo County, Arizona (GC). Skeleton, July 8, 1937, 4500 feet, desert brush, Monument Valley, Utah (UU). Immature ♂, July 11, 1937, 4500 feet, desert brush, in Arizona, near Goulding, Utah (UU). July 16, 1936, adult ♀, 3190 feet, willows, Warm Creek, Kane County, Utah (UU). ♂, July 21, 1937, 3300 feet, desert brush, Rock Creek, Colorado River (UU). ♀ ♂, July 21, 22, 1933, Seri-ot-see Canyon 18 miles northwest of Kayenta, Navajo County, Arizona (MVZ). Adult ♀, July 24, 1935, 6700 feet, pigmy forest, Long Canyon drainage, Navajo County, Arizona (GC). Adult ♀, July 27, 1936, 6000 feet, pigmy forest, five miles north of Navajo Mountain Trading Post, San Juan County, Utah (UU). Immature ♀, August 3, 1934, 6500 feet, pigmy forest, Dągoszhi Biko, Navajo County, Arizona (MNA). ♂ ♂, August 4, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau (UU). Adult ♀, August 13, 1935, 9000 feet, aspens and willows, War God Spring, Navajo Mountain, San Juan County, Utah (GC). August 21, 1938, 6300 feet, an empty nest in old Indian hogan in pigmy forest, five miles southwest of Marsh Pass, Navajo County, Arizona (UU).

Observations: Merriam (1890:93) found it common on the Little Colorado Desert, August 13-19, 1889, and in the bushes bordering the Little Colorado River at Tanner's crossing (a few miles below Cameron), September 21, 1889). Rowley took several specimens along the borders of the San Juan River in Utah from Noland's Ranch to Bluff, April 19-May 23, 1892. Fisher (1903:35) observed it around boulders near Keams Canyon, July 17-31, 1894. University of Utah expeditions found it near Bluff on the San Juan River, Utah, April 28, 1935, and May 11, 1933. Jenks saw three at Ganado, June 24-26, and one at Keams Canyon, June 26, 1933. Stevenson saw three at Chimopovi, 10 miles east-southeast of Oraibi, July 29, 1934. Hargrave saw a pair on U. S. highway 66 at Arizona-New Mexico line, March 19, 1931. Phillips saw pairs generally distributed over the Tuba City region, July 2-9, 1936. Benson saw it in Bridge Canyon north of Navajo Mountain, June 21-24, 1933 (1935:442). Wetherill found it as early as late March at Betatakin, Tsegi drainage, in 1934-36. The R.B.-M.V. expeditions 1933-38 have many records in the months, June to September: 14 in June, 32 in July, 26 in August and 2 in September.

Distribution: Out of more than 130 available records of this bird, one occurred in January (-6°F., Monson), 2 in February, 5 in late March (21-26), 3 in April, 3 in May, 17 in June, 39 in July, 32 in August, 5 in September and 6 in December. There is probably considerable migration even though a few birds winter in the area and probably some return in February or March. The bulk of migration seems to take place in March-April and September, but our data are too meager to be conclusive. Our records certainly indicate that it is a very common bird, widely distributed below 7000 feet, occupying nearly all the low valleys, washes and canyons, which offer it ledges, scattering trees or shrubs to perch on while hunting its insect food. It seems to be one of the most perfectly adapted of all the birds to the desert conditions that it meets. It nests and rears families in all parts of the desert regardless of the proximity to water. We have no evidence whatever that it goes to water to drink, probably subsisting on the water contained in the insect food. It is a common bird along the banks of the San Juan and Colorado rivers, in the various washes of Monument Valley, in nearly all the canyons and side branches of the Tsegi drainage, in the Kayenta and Marsh Pass areas in Kletthla Valley, the Tuba City area, Shonto Canyon and around the base of Navajo Mountain; in fact, wherever our parties have been. Other observers have found it along the Little Colorado, on the desert north of the river, at Keams Canyon and on the San Juan River above Bluff. Nests with eggs have not been found because they are usually past that stage when our parties arrive. Several nests with young have been located, most of them on shelves in ledges or cliffs, but one was found in an old Indian hogan. Downy young were found in the nests on July 2 and 4, but young out of the nest were found as early as June 24, July 2 and by Monson July 8. Those found in the nest would probably have left by July 10. They probably represent a second brood.

LITTLE FLYCATCHER . . . *Empidonax traillii*

Migrant and summer resident among the willow thickets of stream-sides.
Specimens: *F. t. brewsteri*. Resident. ♀, June 7, 1933, two miles west of Lee's Ferry (MVZ). Adult ♂, July 7, 1936, willows by marsh, Pasture Canyon NE of Tuba City, Arizona (MNA). Adult ♀, July 22, 1938, 5400 feet, willows, Pasture Canyon, near Tuba City (UU). Adult ♀, July 26, 1936, 6500 feet, willows, Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult ♂, nestling ♂ and nest, July 29, 1938, 3500 feet, tamarix and willows, bar 44 miles up San Juan River, San Juan County.

Utah (UU). Nest in willows, July 29, 1938, bar 44 miles up San Juan River, San Juan County, Utah (UU). Adult ♂, August 3, 1938, 3200 feet oaks and willows; bar two miles below mouth of San Juan on Colorado River, Kane County, Utah (UU). ♀, August 3, 1937, 7000 feet, oaks, Kaiparowits Plateau, Utah (UU). Nest, August 11, 1938, 3100 feet, in tamarix among willows near Lee's Ferry, Coconino County, Arizona: nest contained one rotten cowbird egg (UU). Immature ♀, August 18, 1936, 4500 feet willows, East Gypsum drainage, six miles below Totem Pole, Monument Valley, San Juan County, Utah (UU). ♂, August 25, 1909, Lee's Ferry (USNM).

E. t. adastus. Migrant. Immature ♀, August 25, 1909, Lee's Ferry (USNM 205644). Adult ♀, July 28, 1935, oaks, Bubbling Springs Canyon, Tsegi Drainage, Navajo County, Arizona (UU 6192). A. R. Phillips, who studied these specimens, regarded the adult as definitely and the immature as probably of this race.

Observations: It has been observed in the willows of Pasture Canyon, July 7, 1936 (ARP), July 22, 1938 (AMW), August 12 and 13, 1938 (AMW) and September 7, 1938 (HNR): in willows near Tuba City reservoir August 21, 1938 (AMW) and September 7, 1938 (HNR). Along the San Juan and Colorado river banks it has been observed in the willow and tamarix thickets, July 29, August 3, 5, 7, 8, 9, 10 and 11, 1938 (Woodbury and Russell), and August 25, 1909 (Nelson).

Comments: All of the 30 records of this bird—11 skins, 3 nests and 16 observations—occur between June 7 and September 7, three months of summer. Our records are inadequate to show when it comes and when it leaves. It is primarily a bird of the willow thickets of streamides generally at low altitudes (3100-6500 feet), but a specimen was taken in the oak brush thickets of higher altitudes (7000 feet) on Kaiparowits Plateau, August 3—doubtless migrant. A nest containing half-grown young was located July 29, 1938, but three empty nests abandoned recently were located along the San Juan and Colorado rivers July 29 and August 11, 1938, two in tamarix among willows, the rest in willows. An immature out of nest was taken August 18.

WRIGHT FLYCATCHER . . . *Empidonax wrighti*

A summer resident of oak chaparral, wandering more widely after the breeding season. **Specimens:** ♂, July 31, 1937, 7000 feet, willows, Kaiparowits Plateau (UU 5131). Adult ♀, with nest and three nestlings, August 13, 1936, 7000 feet, oaks, Kaiparowits Plateau (UU). Adult ♂, August 13, 1936, greasewood, Tsegi Canyon, 1/4 mile above mouth, Navajo County, Arizona (MNA). Adult ♀, August 18, 1936, 5000 feet, in desert brush, two miles east of Totem Pole, Monument Valley, Navajo County, Arizona (UU).

Distribution: We have no satisfactory observations of this bird, and our specimens are so few that they give merely a clue to its niche. The male taken July 31, and the female with a nest and three half grown nestlings taken August 6, 1937, in the oak chaparral in heads of canyons in Kaiparowits Plateau, 7000 feet, were certainly breeding birds. Similar country in the Tsegi Canyon is completely barren of *Empidonax* and none were found in the aspens of the Navajo Mountains. The nest (2 inches in diameter, 1 1/2 inches deep) set in the forks of an oak, was cup-shaped and deeper than the Gray Flycatcher nests, and compactly woven of inner bark fibers, presumably oak or aspen, lined with horsehair and shorter hair, presumably of cattle and chipmunk.

GRAY FLYCATCHER . . . *Empidonax griseus*

A summer resident of the pigmy conifers, raising two broods that scatter to other habitats before leaving in the fall, present at least from April through August.

Specimens: ♀, April 28, 1892, Riverview on San Juan River, Utah (AMNH). ♂, June 14, 1933, in Tsegi Canyon, Navajo County, Arizona, 6000 feet (MVZ). Adult and immature ♂, June 29, July 2, 1938, in pigmy conifers near Marsh Pass, Navajo County, Arizona (UU). Adult ♂, July 11, 1936, 6600 feet, in pigmy conifers near Marsh Pass, Arizona (MNA). Immature ♂, July 12, 1935, 7200 feet, on mesa in Tsegi drainage, Navajo County, Arizona; taken from three young attended by two adults in pigmy conifers (UU). Nestling ♀, July 16, 1938, 7200 feet, on Black Mesa, Navajo County, Arizona, in pigmy forest; one of three in nest attended by two adults (UU). Adult ♂, July 22, 1936, 7800 feet, pigmy conifers, Skeleton Mesa, Tsegi drainage, Arizona (MNA). Adult ♀, July 26, 1935, 7800 feet, in pigmy conifers on Skeleton Mesa, Tsegi drainage, Arizona (UU). Immature ♂, July 26, 1936, 6500 feet, in pigmy conifers near Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult ♂, August 1, 1936, 6750 feet, in oaks, in Water Lily Canyon, Tsegi drainage, Arizona (MNA). Adult ♂, August 1, 1935, 5800 feet, in greasewood, in Tsegi Canyon near Marsh Pass, Arizona (UU). Nest, August 17, 1938, 6500 feet, in pigmy conifers; this nest had been watched through nesting and rearing of young from June 29 to August 3, 1938, near Marsh Pass, Arizona (UU). Adult ♂, August 17,

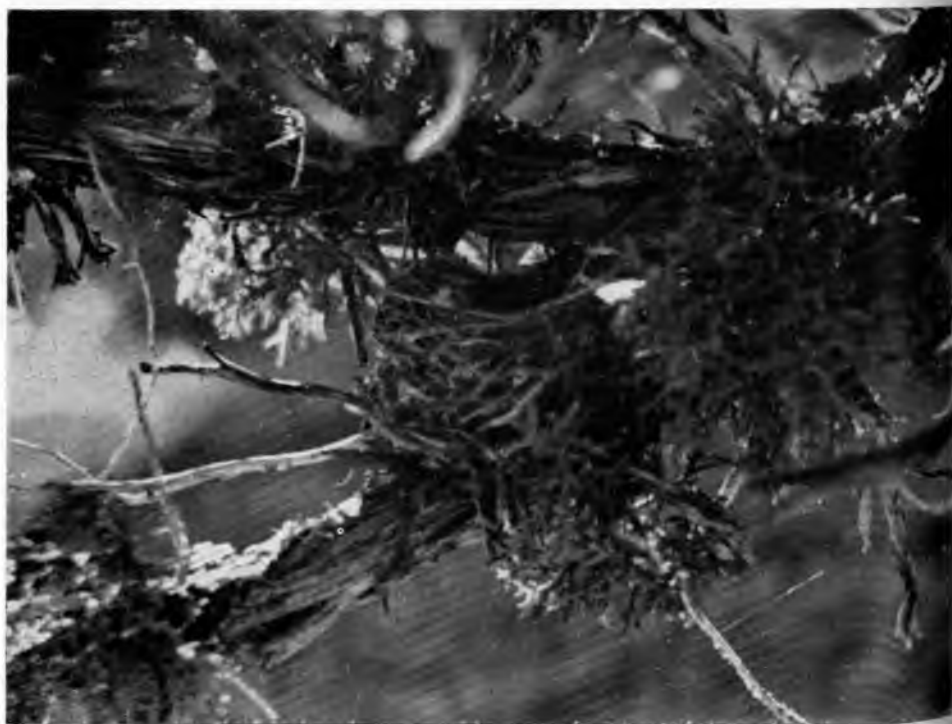


FIG. 8. GRAY FLYCATCHER ON NEST NEAR MARSH PASS CAMP JULY 16, 1938.

Expedition photo by Gray

1936, 4500 feet in desert scrub, Monument Valley, San Juan County, Utah (UU).

Observations: Available observations of this species include those of the RB-MV expeditions, the record of Phillips at Marsh Pass, August 13, 1936; Rowley's April 28 specimen from Blurt, and Monson's records. Our records extend from June 14 to August 22, and are thus inadequate to give the limits of its stay. Grown young out of nest June 29 indicate first nesting by mid-May. We have nearly 30 records of observations in the vicinity of Marsh Pass extending from June 29 to August 17 in the years 1933 to 1938, but most of them in the latter year. There are additional records mainly in the pigmy conifers from many places in the Tsegi drainage, Navajo County, Arizona, and from several places around Navajo Mountain and Monument Valley, San Juan County, Utah. Monson has records from the pigmy conifers ranging from April 20, 1937 (Copper Mine), to August 9, 1937 (Hopi Buttes).

Comments: The Gray Flycatcher has always been busily engaged in nesting activities when our parties have reached the field in late June. During the period of nesting it is strictly confined to the pigmy conifers, but becomes much more widely distributed when the young birds begin to wander, usually during August (1, 17, 22), after leaving their parents. The pigmy conifers range from 5200 to 7500 feet, and there seems to be no reason why the birds should not breed throughout its extent. In August the birds have been found in the open flats of sage or greasewood and even among the cottonwoods. Two broods, leaving the nest in late June and early August, appear to be the rule, each requiring about seven weeks, divided according to our observations of a second brood approximately as follows: nest building, 3 days; egg laying, 3 days; incubation, 14 days; nestlings, 16 days; feeding young after they leave the nest (estimated), 14 days; making a total of 50 days (Russell and Woodbury, 1941:28-37). Observations of two nests indicate that they are bulky structures made chiefly of juniper bark with lining of other material and placed in juniper trees. Further observation on one of the nests indicates that the female lays three immaculate white eggs on successive days and incubates alone for 14 days. Both parents tend the young in the nest for 16 days and outside the nest for an estimated two weeks. The parents, while nesting, exhibited a primitive type of weakness or injury-feigning behavior by dropping to the ground in front of an intruder and trying to entice him away by weakly fluttering along in front, just out of reach.

INTERIOR WESTERN FLYCATCHER . . . *Empidonax difficilis hellmayri*

A summer breeder in the cool moist heads of canyons bearing ponderosa pines or Douglas firs at altitudes from 6500 to 7500 feet, occasionally lower or higher.

Specimens: Adult ♀, July 9, 1935, 6800 feet, Douglas fir and Gambel oaks, Long Canyon, Tsegi Drainage, Navajo County, Arizona (GC). Adult ♂ and ♀ ♀ with nest and 3 eggs in hole in ledge, July 11, 1938, 7200 feet, yellow pine and red cedar, Black Mesa, five miles NW of Coal Mine, Navajo County, Arizona (UU). Adult ♀ (brood patch), July 15, 1936, head of Water Lily Canyon, Tsegi Canyons, above deciduous thickets and running water (MNA). Adult ♂ (t. e.), July 18, 1935, 6800 feet, in coniferous forest in Long Canyon at Ladder House, Tsegi Drainage, Navajo County, Arizona (GC). Adult ♂, July 21, 1934, 7000 feet, Transition Zone in Nagoszhi Biko, Tsegi Canyons, Navajo County, Arizona (MNA). Adult ♂, July 23, 1936, mixed zones, Douglas firs, head of Dogoszhi Biko, Tsegi Canyons

(MNA). Adult ♀, July 23, 1936, mixed zones, Douglas firs, Dogoszhi Biko between head and Nagoszhi Biko, Navajo County, Arizona (MNA). Adult ♀, August 7, 1936, 6000 feet, Gambel oaks, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU).

Distribution: All of our 24 records of this bird occur between June 15 and August 7. It is a bird of secluded nooks and heads of canyons, mostly out-of-the-way places where it is not commonly seen. When it arrives and departs is not known. Most of the records were taken at altitudes of 6500 to 7500 feet, but one in Beaver Canyon, north of Navajo Mountain, was about 6000 feet. This may have been a migrant.

It has been found in canyon heads and box canyons where Douglas fir, yellow pine, oak brush or red cedars abound; in Long Canyon, Bubbling Springs Canyon, Water Lily Canyon, Nagoszhi Biko, Dogoszhi Biko, Black Mesa near Coal Mine and in Beaver Canyon, all in similar places at the heads of canyons. Monson saw one on Bahlakai Mesa, June 15, 1937, and Hargrave saw a "few" near Arizona-New Mexico line on U. S. Highway 66, March 18-19, 1931, and located six pairs in three-fourths mile at head of Tabiko on May 30, 1937. A nest was found July 11, 1938, on Black Mesa Rim about 13 miles SW of Marsh Pass, in a pocket in a face of a ledge about four feet up by M. B. Mittleman. We watched the nest and parents for several hours. The female only incubated, the male remaining within 100 yards, singing frequently. His song may be rendered *per'-ty* or *per'-tee* in a high pitch with the accent on the first syllable. Three pairs seemed to have divided up the territory of the yellow pines and red cedars forming a narrow strip about a fourth of a mile in length. The nest, made of moss and lined with red cedar bark, contained three white eggs, speckled or even spotted with brown, mostly around the larger end. The other two pair also appeared to be incubating, but the nests could not be located. These were probably eggs of a first brood, as no young out of nest were observed and none of the parents were observed to carry any food.

Classification: Several of our specimens have been examined by Brod-korb and referred to this race, *E. d. hellmayri*.

WESTERN WOOD PEWEE . . . *Myiochanes richardsoni richardsoni*

Late spring as well as late summer and early fall migrant in wooded country at all altitudes, more abundant in the higher forests where it is probably a sparse breeder.

Specimens: ♂ ♀, June 21, 1927, Lukachukai Mountains 15 miles east of Lukachukai School (summit 8000 feet), (Trapier USBS). Adult ♂, June 24, 1934, 6700 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). ♀, June 25, 1927, Wheatfield Creek, west slope of Tunicha Mountains, 7000 feet (Cantwell, USBS). July 23, 1933, Segi-ot-sosie Canyon (MVZ). Adult ♀, August 12, 1935, 9000 feet, ponderosa pines, Navajo Mountain, San Juan County, Utah (UU). Adult ♀, August 13, 1934, Dogoszhi Biko, ½ mile above Water Lily Canyon, 6000 feet, Navajo County, Arizona (MNA). Immature ♂, August 13, 1936, 8500 feet, ponderosa pine forest, War God Spring, Navajo Mountain, San Juan County, Utah (UU). Immature ♀, August 20, 1938, 5400 feet, dead tree near reservoir, in Pasture Canyon near Tuba City, Coconino County, Arizona (UU).

Observations and Comments: E. W. Nelson, in 1909, found it common in the pines 15 to 25 miles NW of Fort Defiance about July 31 or August 1.

where it may have been breeding, and among the pigmy conifers and streamside trees between August 7 and 22, at Eagle Crags, Keams Canyon 18 miles west of Oraibi, Tuba City, and Cedar Ridge, undoubtedly transients in migration. Trapier and Cantwell in 1927 found it in the Tunicha and Lukachukai Mountains between 7000 and 8000 feet in late June, undoubtedly in its breeding range. Monson has observed what appear to be migrants at Tees-Nos-Pas in extreme NE Arizona, September 15, 1936, and at Keams Canyon, Toreva and Oraibi, May 19-26, 1937. The RB-MV expeditions found it well distributed in all sorts of wooded country in the height of migration during August, but found it more abundant in the higher forests. A few specimens and observations were obtained in the canyons and on Navajo Mountain in June and early July, indicating that it may be a sparse breeder although no evidence was obtained to prove it conclusively. During migration it has been found in pigmy conifers, streamside trees, oak brush and the coniferous forests. It is nearly absent in June and July but returns in southward migration in early August (9, 13) and seems to be common during the rest of the month and the first half of September.

OLIVE-SIDED FLYCATCHER . . . *Nuttallornis mesoleucus*

Late spring and early fall migrant in wooded country at all altitudes but more numerous in the higher forests where it may be a sparse breeder.

Specimen: Two ♂, June 23, 24, 1927, Wheatfield Creek, Tunicha Mountains, 7000 feet (Trapier and Cantwell, USBS). Adult ♀, August 6, 1936, 6500 feet, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♂, August 7, 1934, 6800 feet, Water Lily Canyon, Navajo County, Arizona (MNA). Adult, August 9, 1935, 8500 feet, ponderosa pine, SW side of Navajo Mountain, San Juan County, Utah (GC). Adult ♂, August 13, 1935, 9000 feet, ponderosa pine, near War God Spring on Navajo Mountain, San Juan County, Utah (GC). ♂, August 10, 1937, 7000 feet, pigmy conifers, Kaiparowits Plateau (UU).

Observations: May 12, 1937, one seen five miles north of Keams Canyon (GM). June 16, 1937, one in pigmy conifers on Bahlakai Mesa (GM). August 6, 7, 8, 9, 12, 1937, Beaver Creek Canyon, 6500 feet, pinon covered slopes; one or two each day (HNR). August 9-17, 1935, very common in Transition Zone (HNR). August 10, 1938, 3120 feet, Colorado River 3½ miles above and ½ mile below Lee's Ferry at mouth of Paria Creek, one at each place (AMW). August 11, 1938, Defiance Plateau (GM). August 13, 1934, Tyende Mesa, one seen (HNR). August 13, 1937, near War God Spring, Navajo Mountain, San Juan County, Utah, 8500 feet, "about half a dozen birds in the pine forests" (HNR).

Discussion: The only indication but not proof of breeding are the two Tunicha Mountain birds. All the other records seem to indicate migrants. It is of course possible that it breeds on Navajo Mountain, but three weeks of intensive work failed to reveal it there in July, 1936. Available records seem to indicate that it is absent from most of the Navajo Country during that month. During migration it has been found from 3100 feet on the Colorado River to 9000 feet on Navajo Mountain, where it was apparently more common than in lower altitudes.

DESERT ± MONTEZUMA HORNED LARK . . . *Otocoris alpestris leucolaema* ± *occidentalis*

A permanent resident of the open flats and valleys where the vegetative cover is short and sparse.

Specimens: Adult ♂♂, January 20, 1934, five miles NE of Tuba City, Coconino County, Arizona (MNA). Adult ♂, March 22, 1934, Tonalea (Red Lake), Coconino County, Arizona (MNA). Adult, May 1, 1935, rim of San Juan River, 12 miles west of Mexican Hat, Utah (UU). ♂, May 7, 1903, Adamana on Rio Puerco, Apache County, Arizona (LAF). June 6, 1927, Oraibi, Navajo County (USBS, 6 specimens). Adult ♂, June 14, 1938, U. S. Highway 66, 20 miles west of New Mexico line (MNA). Adult ♀, June 23, 1938, 4000 feet, bare desert flats, near Cameron, Coconino County, Arizona (UU). Juvenile and ♀, June 26, 1933, NW of Ganado (UA). Juvenile and ♂, July 2, 1927, near Bluff, Utah (BYU). ♂, July 5, 1927, Monument Valley, Arizona (BYU). Adult ♂, ♀♀ and juvenile, July 8, 1938, 8000 feet, sage flats, near Little Man's Lake, Navajo County, Arizona (UU). Adult ♀ and juvenile, July 13, 1933, 5800 feet, Kayenta, Navajo County, Arizona (MNA). Adult ♂ and juvenile, July 14, 1933, 5800 feet, Kayenta, Navajo County, Arizona (MNA). July 15, 1909, near Winslow (USBS). July 29, 1934, 8-16 miles SE of Polacca, Navajo County, Arizona (MVZ). Adult ♂♂, July 18, 1938, 6000 feet, open flats, Kletthia Valley, 10 miles NE of Cow Springs, Coconino County, Arizona (UU). Adult ♂, August 20, 1936, five miles NE of Kayenta, Navajo County, Arizona (UU). ♂, August 20, 1938, near Little Man's Lake, Navajo County, Arizona (UU). August 25, 1931, Marble Canyon, 25 miles south of bridge, five specimens (W. P. Taylor).

Observations: Loring in 1893 reported seeing several small flocks near Noland's Ranch on the San Juan River in Utah near 4-corners, November 17-27. Oberholser (1902:855) called attention to it breeding on the south side of Little Colorado River. Fuertes in 1903 found it near Adamana on the Rio Puerco May 7. Birdseye took specimens near Winslow, July 15, 1909. Trapier and Cantwell encountered it around Oraibi, June 6, 1927. Cottam found it near Bluff, Utah, July 2, and Monument Valley, Arizona, July 5, 1927. Hargrave saw 25 near Winslow, December 26, 1930, and found it numerous near Navajo on U. S. Highway 66, March 18, 1931. Taylor took specimens from the banks of Marble Canyon of the Colorado River 25 miles south of the bridge, August 25, 1931. Jenks, while traveling from Holbrook to St. Michaels via Querino Canyon, saw "numbers" near Holbrook and along the latter part of the road on June 20, 1933, and encountered it again NW of Ganado, June 26. Stevenson took specimens 8-16 miles SE of Polacca, Apache County, July 29, 1934. Wetherill observed several flocks of 25 to 75 along the road between Kayenta and Tuba City, October 1, 20 and 27, 1936. saw thousands September 1, 1940, between Marsh Pass and Kayenta, and several thousand around Kayenta December 1-20, 1941. Phillips saw two on the road north of Cameron, July 2, 1936. Lockett observed some near Tuba City, December 15, 1938. Monson (1937a:67) reported six on the Tuba City Christmas Census, December 19, 1936, and in addition has "numerous records from all parts of the reservation." Members of the RB-MV expeditions have many records. Hargrave found it common around Kayenta, June 8, 1933, and saw a few on the road to Tuba City the same day and again on the same road June 17, 1934. He also recorded several in Tsegi Canyon, March 23; two the next day at Kayenta. On July 13 and 14, 1933, he reported observing them singly, in families and in flocks of 15-25 on the almost barren flats bearing low scrubby brush between Kayenta and Black Mesa. Woodbury and Russell have 13 records from the flats and valleys between Cameron and Kayenta scattered between June 23 and August 21, 1938.

Comment: Of all the birds of the area, the horned larks come nearest to meeting the full force of the physical environment with but little, if any,

amelioration from the plants. Their chief habitat seems to be the open flats and valleys where the vegetation is scantiest, and where the full force of the desert sunshine or the cold sweep of winter winds can easily reach them. Open grassy flats interspersed with small bushes, sagebrush valleys, and over-grazed areas covered with matchweed are all suitable habitats. They build their nests in shallow depressions in the ground usually near a small plant and raise their young under intense heat from the sunshine. The young are generally out of the nest when our parties reach the field in late June or early July. These birds have been observed in nearly all the open flats from Monument Valley to Cameron, including Kayenta Valley, Klethla Valley, Tonalea and Tuba City, but undoubtedly in many similar places all over the Navajo Country.

Discussion: The resident population, no doubt, shifts some in the winter time and it would be expected that transients from farther north might mix with the local birds during that period. Because of the great specific variability and the difficulty of separating subspecies, it becomes practically impossible to separate the transients from the local birds in the field, and consequently field observations are treated in this work as if they applied to the resident population with the possibility of intermixture of transients during the winter. However, special examinations of M.N.A. winter-taken specimens showed nothing that could be separated from the resident population.

Classification: Dr. William H. Behle indicated that our specimens were intergrades between *O. a. leucolaema* and *occidentalis*, probably slightly nearer the former. They closely resemble topotypical birds from near Santa Fe, New Mexico, which themselves are intergrades, the most typical form of *occidentalis* being from the White Mountain region of central eastern Arizona.

VIOLET-GREEN SWALLOW . . . *Tachycineta thalassina lepida*

A common breeding resident as well as an abundant migrant in August and probably in April and May.

Specimens: Adult ♂, April 28, 1935, near Bluff, Utah (UU). Specimen, mid-May, 1858, Fort Defiance (Baird 1861:5). Adult ♂ (t.e.), June 6, 1934, 5880 feet, Kayenta, Navajo County, Arizona (MNA). ♂, two ♀, June 23-25, 1927, Wheatfield Creek, Tunicha Mountains, 7000 feet (Trapier, USBS). Adult ♂, July 2, 1935, 6400 feet, mouth of Long Canyon, Tsegi Drainage, Navajo County, Arizona (GC). Adult ♂, July 6, 1935, 6400 feet, Long Canyon, Tsegi Drainage, Navajo County, Arizona (GC). Adult ♂, July 6, 1935, 6400 feet, Long Canyon, Tsegi Drainage, Navajo County, Arizona (GC). ♀, July 7, 1937, 4800 feet, two miles east of Burnheimer Bridge, Monument Valley, Navajo County, Arizona (UU). Juvenile ♀, July 12, 1937, 4500 feet, canyon reservoir, Goulding, Utah (UU). Immature ♂, July 13, 1936, 3200 feet, river bank in side canyon, Colorado River, San Juan County, Utah (UU). Adult ♀, July 21, 1936, head of Dogoszhi Biko, Tsegi canyons, Navajo County, Arizona (MNA). July 23, 1933, Segi-otsosie Canyon (MVZ). Adult ♀, July 27, 1936, 6000 feet, pigmy conifers, four miles north of Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult ♂, July 29, 1934, Chimopovi, 10 miles SE of Oraibi (JOS). Juvenile ♀, August 19, 1938, 5500 feet, two miles west of Kayenta, Navajo County, Arizona (UU). Sharpe (1885, 10:121) lists the skin of a chick from Fort Defiance.

Observations: Mollhausen (Baird 1861:5-6) seems to have been the first to find this bird in the Navajo Country (May 23, 1858). Fisher (1903:35) reported it at Keams Canyon July 17-31, 1894. Trapier found

it in Wheatfield Creek in the Tunicha Mountains June 23-25, 1927. Jenks saw it at Fort Defiance, at Chi Dodge (20 miles north) and a little natural bridge (five miles SW), June 21-22, 1933. Stevenson found it at Chimopovi, 10 miles SE of Oraibi, July 29, 1934. Wetherill has many records of observations at Betatakin and Kiet Siel canyons and at Kayenta in the years 1934-36, extending from April 22 to the first week in August. Phillips saw one at Tuba City, July 2, and found it so common at Pasture Canyon, July 7, 1936, that he thought it must be nesting nearby in sandstone cliffs. Monson has numerous records from Upper Sonoran and Transition zones from many places. His earliest record is two birds at Kayenta Reservoir, April 9, 1937. His latest is four from Oraibi, August 24, 1938. Our R.B.-M.V. expeditions have 85 recorded observations extending between June 14 and September 6 in years 1933-38. It was common along the San Juan and Colorado rivers during July and August in several different years when expeditions descended the rivers. It was also common at Pasture Canyon, in Shonto Canyon, in many of the Tsegi canyons, along Laguna Creek between Kayenta and Marsh Pass, on Black Mesa, at the reservoir in Goulding Canyon and on Navajo Mountain.

Comments: This is one of the widely distributed birds of the region. It is found during the breeding season at nearly all altitudes in the area and probably nests where found. It is less common over the open desert than elsewhere. Nesting records are scarce, but juvenile birds just out of nest were numerous in July and it is evident they had been reared in close proximity. Russell reported a nest in an old woodpecker hole on Navajo Mountain, and Teall saw adult birds feeding young in a nest in the face of a cliff on the Colorado River just below the mouth of the San Juan (3300 feet). Woodbury observed a pair feeding young in a nest on the face of a cliff in the mouth of "Dorr" Canyon on the north bank of Colorado River, Kane County, Utah, July 17, 1937. It seems probable that most of them must nest in the cliffs. The juveniles are difficult to distinguish from the tree swallow. The earliest records come in April and May which probably represent the spring migration. It is widely scattered during July, but is concentrated in huge flocks in August, probably representing the fall migration. Extreme dates are April 9 and September 6.

TREE SWALLOW . . . *Iridoprocne bicolor*

A migrant in small numbers. **Specimens:** Adult ♂, July 7, 1936, reservoir north of Tuba City, Arizona (MNA). Immature ♀, August 19, 1938, 5300 feet, near Kayenta Reservoir, Navajo County, Arizona (UU).

Observations: July 7, 1936, reservoir at Tuba City, two adults and at least two juveniles seen (ARP). July 15, 1936, Tsegi Canyon, an adult, feeding aimlessly, was seen at close range up Dogoszhi Biko about three miles from Kiet Siel Canyon; no other swallows were seen (LH). July 21, 1938, 5300 feet, Pasture Canyon Reservoir, a few among violet-green flocks (AMW). August 13, 1936, Tsegi Canyon, two adults seen flying down main Tsegi near mouth, above water (ARP). August 16, 1936, 4500 feet, Gypsum Jungle, Monument Valley, Navajo County, Arizona: four individuals well seen and characteristic note heard—flying with violet-green swallows over willows (HNR). September 7, 1938, 5400 feet, Pasture Canyon, upper lake; one adult bird seen (HNR).

Distribution: The status of this bird is not at all clear from our records. Because of the resemblance to the juvenals of the violet-green, and because it sometimes comes in small numbers mixed in the violet-green flocks

containing juvenals, it is entirely possible that it has been overlooked too much. It probably does not breed on Navajo Mountain. It was not found there on the expeditions, but it has been reported breeding in the La Sal Mountains, not much farther north in Utah.

BANK SWALLOW . . . *Riparia riparia riparia*

Migrant. Observations: July 7, 1936, a single bird at Tuba City Reservoir, Navajo County, Arizona (ARP). August 2, 1917, Goldman (USBS) reported one along Moencopie Wash, but Phillips questions his identification because he did not distinguish it from *Stelgidopteryx*. August 11, 1938, Ganado, Apache County, Arizona, flock of five (GM). September 30, 1938, one at Snake Butte SW of Keams Canyon (GM).

Comments: Even though there are no available specimens of this species from our area, it seems certain from the available observations and from known information both north and south of the Navajo Country that it must pass through in migration.

ROUGH-WINGED SWALLOW . . . *Stelgidopteryx ruficollis serripennis*

A common migrant and a sparse breeding summer resident along streams. **Specimens:** Adult ♂, July 6, 1936, two miles SW of and below Tuba City (farms) (MNA). Juvenile ♀, August 4, 1938, streamside, bar 63 miles above Lee's Ferry, San Juan County, Utah (UU).

Observations: Fisher (1903:35) saw one bird at Keams Canyon, July 28, 1894. Nelson (USBS) in 1909 found it common at Winslow, July 11-25; at Holbrook, July 25-28; at Fort Defiance, July 30; at Keams Canyon, August 9; around Tuba City, August 14-20; and at Lee's Ferry, August 23-26. He also saw "a few" at Chin Lee, August 2 or 5, and observed it at Chambers and near Adamana. Stevenson in 1934 found four in an arroyo near Oraibi on July 29. Phillips in 1936 saw one in Tuba City, July 2; 2 to 4 daily on Moencopie Wash below Tuba City July 2-9, and several in Tsegi Canyon August 13. Monson reports that it was seen throughout the summer in various places. His earliest record was one at Pollaca, May 6, 1937, and his latest was one north of Chin Lee, September 12, 1938. Our R.B.-M.V. expeditions have 20 recorded observations, 6 during the month of July and 31 in August in years 1934 to 1938. These are reported from the San Juan and Colorado Rivers and in several valleys around streams or ponds especially near Tuba City, Cow Springs, Kayenta Reservoir, and the Tsegi Canyon. Russell reported a pair nesting in the bank of Tsegi Canyon wash about three miles from Marsh Pass on July 30, 1935, which had four young ones nearly grown.

Comments: During the period of our observations in 1938 (July 2-August 22), they have been seen sparingly in small numbers only and not in large flocks. Judging from the one nesting record in Tsegi Canyon, single pairs probably nest at scattered points. Young birds probably leave the nest in late July or early August, thus increasing the population numbers which are also augmented by migration in August. Extreme dates appear to be May 6 and September 12.

BARN SWALLOW . . . *Hirundo rustica erythrogaster*

Spring and fall migrant, in April-May and August-September; probably a breeder on the Little Colorado River near Holbrook. **Specimens:** Adult ♀,

May 11, 1933, near Bluff, San Juan County, Utah (UU). ♂, May 17, 1892, near Bluff on San Juan River, Utah (AMNH).

Observations: Merriam (1890:98) saw several at Tanner's Gulch (Pasture Canyon), near Tuba City, September 24, 1889, probably transients. Streater saw a few between Holbrook and Winslow along the Little Colorado River, April 19 to May 7, 1893, probably in migration. Fisher found it "common" at Holbrook July 15-17 and August 4-8, 1894, probably breeding there. Skinner in 1916 saw two fly over his camp 20 miles south of Walpi or 12 miles north of Cedar Springs, Navajo County, September 14, and two fly south over Chin Lee, September 26, all probably in southward migration. Phillips saw some near Joseph City on Little Colorado River, September 11, 1936, and one between there and Holbrook, May 4, 1937. Monson has a spring record of one bird on Wildcat Mesa, May 20, 1937, and four fall records; one near Tees-Nos-Pas in extreme northeastern Arizona, September 14, 1938, two at Dinnehotso, September 25, 1936, two at Red Lake north of Fort Defiance, September 30, 1936, and five near Snake Butte, October 13, 1938. Woodbury and Russell saw one in Pasture Canyon August 22, 1938.

CLIFF SWALLOW . . . *Petrochelidon pyrrhonota*

A common breeding resident, nesting on the face of cliffs near streams and meadows.

Specimens: *P. p. albifrons*—Northern Cliff Swallow. Two ♂, April 28 and May 1, 1892, Riverview on San Juan River, Utah (AMNH). Adult ♀, July 8, 1938, 6600 feet, over Little Man's Lake, Navajo County, Arizona (UU). Adult, July 12, 1938, 6400 feet, at stream, Shonto Canyon, Navajo County, Arizona (UU). Nestling ♀, July 12, 1938, 6400 feet, nest in cliffs. Shonto Canyon, Navajo County, Arizona (UU). Adult ♂, July 13, 1938, Shonto Canyon, Navajo County, canyon wall, 6300 feet (UU).

P. p. tachina—Lesser Cliff Swallow. Adult ♀, July 6, 1936, over farms one mile south of Tuba City, Coconino County, Arizona (MNA).

Observations: Merriam (1890:98) first observed several birds and many nests on a cliff at Grand Falls on Little Colorado River on August 14, 1889. Rowley observed it on the San Juan River at Riverview, Utah, in late April and early May, 1892. Fisher (1903:35) saw it at Keams Canyon in late July, 1894. Jenks saw "several at Ganado, June 24-26, 1933, and reports some "nesting colony" records in the Little Colorado Valley. Phillips found it common by May 4, 1937, at the lake between Joseph City and Holbrook on the Little Colorado River. He found it common in the Tuba City vicinity July 2-9, 1936, both in Moencopie Wash and Pasture Canyon, where he also found many nests. Monson has many records. His earliest is a report of eight birds at Keams Canyon, May 6, 1937, and his latest, two at Keams Canyon August 28, 1937. He reported it breeding at Keams Canyon, Steamboat and Ganado. Woodbury and Russell have 22 records between June 23 and September 7, 1938, from Cameron, Tuba City, Shonto Canyon, Klethla Valley, Kayenta, Marsh Pass and Colorado River.

Distribution: Local colonies of this Cliff Swallow seem to be well distributed over the entire area from the San Juan to the Little Colorado rivers. Its nesting activities appear to be restricted to cliffs that are close enough to water to furnish a supply of mud for its globular side-opening mud nests. Such nests, with or without birds in attendance indicating breeding

colonies, have been reported from the San Juan, Colorado and Little Colorado rivers, from Shonto Creek, Pasture Canyon, Keams Canyon, Steamboat and Ganado, but birds have been observed from many other places, sometimes several miles away from the nearest nesting place. Usually the birds are found over streams, lakes, ponds or meadows, but occasionally are found wandering over the valleys or canyons. There are probably many other nesting sites not discovered, but despite all the expeditions into the Tsegi canyons, we have no record of nests or birds there.

Breeding: At a nesting colony in Shonto Canyon July 12-13, 1938, Woodbury and Russell found birds with nests in various stages of breeding activity. One group of 20-30 pairs were gathering mud at the stream bank and carrying it to the face of a cliff nearby where they were building new nests apparently in preparation for a second brood. Young were on the wing. Other groups were engaged in bringing food to the nests, and it was believed that some were incubating. It seemed evident that most of the nests contained young. Phillips found young in the nests at Pasture Canyon, July 7-8, 1936, and found young on the wing at Tuba City Reservoir for the first time on July 9.

Classification Note: This treatment of the Cliff Swallow has not distinguished between the two subspecies except in the determination of specimens. It is assumed that most of the breeding population belong to the subspecies *P. p. albifrons*, but the single specimen from Tuba City that has been determined as *P. p. tachina* raises the unanswered question of where intergradation occurs and what areas are covered by the different subspecies.

LONG-CRESTED JAY . . . *Cyanocitta stelleri diademata*

A permanent resident of the coniferous forests and the denser stands of oaks and other trees in lower canyons as low as 6800 feet.

Specimens: Adult ♀, January 14, 1938, in conifers below Pueblo in Betatakin Canyon, Navajo County, Arizona (MNA). Adult ♀ ske'et'en, February 3, 1938, 6800 feet, in conifers near Betatakin, Pueblo, Tsegi Canyons, Navajo County, Arizona (MNA). Nest only, June 1, 1935, 7000 feet, Betatakin Canyon. This is the nest from which several young were killed by a snake (MNA). June 19-26, 1927, series of specimens from Tunicha and Lukachukai Mountains (Cantwell and Trapier, USBS). Adult ♂, July 9, 1935, 6800 feet, in side canyon, Douglas fir near mouth of Long Canyon, Tsegi drainage, Navajo County, Arizona (UU). Juvenile ♀, July 10, 1936, 9000 feet, ponderosa pines near Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Adult ♀, July 13, 1933, War God Springs, Navajo Mountain, 9000 feet (MVZ). Juvenile ♂, July 20, 1934, conifers in Water Lily Canyon, Navajo County, Arizona, 6900 feet (MNA Z8.365). Adult ♂ and juvenile ♀, July 22, 1936, head of Dogoszhi Biko, Navajo County, Arizona (MNA). Adult ♀ and juvenile ♂, August 10, 1936, 7500 feet, ponderosa pines in Navajo Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♀, August 12, 1935, 9000 feet, near ponderosa pines, War God Spring, Navajo Mountain, San Juan County, Utah (UU). Hargrave (1939:209) reports a humerus taken from Kiet Siel Pueblo Ruins, Tsegi drainage, Navajo County, probably deposited prior to 1300 A.D.

Observations: Cantwell and Trapier's collection of specimens in the Tunicha and Lukachukai Mountains, June 1-26, 1927, seems to be the first indication of the birds' presence in the Navajo Country. Jenks saw several in the pines on the road from Querino Canyon to St. Michaels, June 20, 1933.

Monson says it is common on Lukachukai Mountains and Defiance Plateau (1936-9). Benson saw it every day from June 13-20, 1933, in the ponderosa pines on the Navajo Mountain, where he took four specimens. Wetherill noted it almost daily in Betatakin Canyon during the months January to October in years from 1934 to 1936. Our R.B.-M.V. expeditions have about 17 recorded observations in oaks, firs and ponderosa pines. Russell reported 10-20 per day on many days between July 1-22, 1936, on Navajo Mountain and remarked on August 13 that they were as numerous as ever. Hargrave, Teall and Russell each recorded it several times from various canyons of the Tsegi drainage. Woodbury and Russell found it on Black Mesa in the ponderosa pines about 12 miles SW of Marsh Pass, July 11 and 16, 1938.

Distribution: This noisy conspicuous but wary bird is found principally among the firs, yellow pines and oaks, which are mostly limited to altitudes over 6800 feet. It is numerous on Navajo, Tunicha and Lukachukai Mountains and Defiance Plateau, but is more sparsely scattered in many smaller habitats in the Tsegi canyons, Black Mesa and possibly other mesas with protected canyon heads.

Breeding: It appears to be a permanent resident and seems to breed wherever it is found. Woodbury and Russell found two used nests, one in a ponderosa pine and one in a monster juniper tree nearby, July 16, 1938. The young had presumably been gone some time. Wetherill found a nest made of sticks and grass cemented with mud and lined with horsehair and rootlets about 12 feet up in a boxelder tree in Betatakin Canyon. It contained six eggs May 11, 1936, and had five young about a week old on May 24. By June 1 they were so nearly grown that they would probably have left the nest in 2-3 days. On that day a bull (gopher) snake was found robbing the nest. One young was dead on the ground below the nest, one in the nest and one was being swallowed by the snake. By inference, it would seem that the young ones remain in the nest about two weeks after hatching. The parents are probably occupied with nesting in May, with young birds out of the nest in June, and the young birds are probably well scattered by July.

Classification: Specimens from our area compared with a large series from western North America have measurements and plumage indicating intergradation with Oberholser's *cottami* but with closer affinities to *diademata* than any other race.

WOODHOUSE JAY . . . *Aphelocoma californica woodhousei*

Permanent resident of deciduous oak thickets and sparsely distributed through adjacent pigmy conifers, streamside thickets or coniferous forest.

Specimens: Adult ♀, January 24, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). ♀, June 15, 1933, 6500 feet, Tsegi Canyon (MVZ). Immature ♂, June 30, 1935, 6500 feet, Gambel oak, Bubbling Springs Canyon, Tsegi Drainage, Navajo County, Arizona (GC). Immature ♀, July 2, 1936, 8500 feet, ponderosa pine and aspen, near Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Specimen, July 7, 1937, 5800 feet, pigmy forest, in canyon two miles SE of Burnheimer Bridge, Inner Comb, Navajo County, Arizona (UU). ♀, July 12, 1937, 4500 feet, cliff rose and juniper, Goulding, Utah (UU). Immature, July 13, 21, 1934, 6700 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). Juvenile ♀, July 28, 1935, 6500 feet, Gambel oak in Long Canyon, Tsegi drainage, Navajo County, Arizona (GC). Adult, July 25, 1936, 6500 feet, pigmy forest, near Navajo Mountain Trading Post, San Juan County, Utah

(UU). ♀ and juvenile ♀, July 29, 31, 1937, 7000 feet, serviceberry, Kaiparowits Plateau, Kane County, Utah (UU). ♀, August 2, 1894, Keams Canyon (Fisher, USBS). August 8, 1909, 20 miles east of Keams Canyon (Nelson, USBS).

Observations: Loring reported it common in the underbrush along the San Juan River near Bluff, Utah, November 8-15, 1893. These may have been winter transients. Fisher saw it daily around Keams Canyon, July 17-31, 1894. Nelson found it 20 miles east of Keams Canyon, August 8, 1909. Hargrave found it around many of the Hopi villages, October 15-17, 1931. Benson in 1933 found it near Rainbow Lodge at foot of Navaio Mountain in Utah, June 15, and in the piñon conifers five miles south of Navaio Mountain in Arizona, June 27. Wetherill noted it in Betatakin and Kiet Siel canyons almost daily nearly every month in the year during the years 1934-36. Stevenson saw a couple in the junipers along the cliffs at Chimnovi, 5900 feet, July 29, 1934. Monson says it is "fairly common in the Upper Sonoran woodland." It has been noted in the Tsegi canyons many times by members of the R.B.-M.V. expeditions, especially from June to August. It was more common in canyons with oak thickets but was also found in piñon conifers and mixed vegetation in heads of canyons. The expeditions have 13 recorded observations in June, 22 in July and 5 in August, but included in addition to the Tsegi Canyons such places as Black Mesa, the lower portions of Navaio Mountain, the "Gypsum Jungle" in Monument Valley near Utah-Arizona line, and certain thickets along the Colorado River in Utah.

Distribution: While this bird is primarily an inhabitant of the oak thickets, it is not necessarily obligate to them, often spreading into neighboring areas of ponderosa pine, piñon forest or mountain brush that present the aspect of thickets. It is not primarily an inhabitant of the junipers and piñons like the Pinon Jay, but occupies a niche usually at a little higher altitude, although it is less obligate to its habitat and spreads out more into different places and different altitudes during the fall and winter, suggesting slight migration tendencies. It appears to be most plentiful in the oak belt on Navaio Mountain and in the canyons in the Tsegi drainage and the canyons of Black as well as other mesas, but is not generally found on the mesa tops nor in the open valleys. It is occasionally found in unusual places where thickets occur. It has been observed on the Colorado River below the mouth of the San Juan (3300 feet) in proximity to the oak thickets along the river bank, and Hargrave found it around the Hopi villages where there were only a few planted trees.

Breeding: The birds appear to nest in solitary pairs in the area they inhabit. Wetherill reports a nest with six eggs on June 2, 1935, indicating that it is probably a little later nesting than the Long-crested Jay. After the young birds leave the nest, they appear to remain together with the parents as family flocks. Russell reports observing many pairs of adult birds during late June, but others have noted family flocks from July 2 on through the month.

Classification Note: The Woodhouse Jays of the Navaio Country appear from our measurements to have smaller bills and shorter tarsus but longer tails than the typical birds.

AMERICAN MAGPIE . . . *Pica pica hudsonia*

Sparse resident on San Juan River and possible elsewhere.

Specimens: December 8, 1853, specimen taken on Little Colorado River, one or two miles east of Winslow, Arizona, by Kennerly and Mollhausen.

Nestling ♂, June 27, 1873. Navajo Springs on Rio Puerco, Arizona, by Newberry. ♂, July 2, 1927, Bluff, San Juan River, Utah, common among the cottonwoods, one specimen (BYU). October 27, 1931, Bluff on San Juan River, Utah, one specimen (UU). December 15, 1938, a fresh skin from a freshly-skinned bird was picked up in the street at Tuba City by H. C. Lockett, who gave it to Hargrave (MNA).

Observations: Mearns (1896:399) reported that an old Hopi Indian had told him in 1884-88 that magpies were common about the Moki villages. November 8-15, 1893, several seen along the river bank near Bluff, Utah (Loring). November 17-27, 1893, common at Noland's Ranch, where they fed with the pigs and chickens in the corral (Loring). September 19, 1936, Monson (1939:168) saw one at Tees-Nos-Pas, near 4-corners in Arizona.

Discussion: The R.B.-M.V. expeditions did not find the Magpie in the area covered by them. It is probably rare or absent over most of the Navajo Country at the present time, but appears to be present along the San Juan River above Bluff, both in Utah and New Mexico. Phillips and Hargrave think it has contracted its range in NE Arizona within the last century. They point out (letter) that it formerly bred along the Little Colorado River (specimen 1853, nestling 1873), and was supposed to be common around the Hopi villages in the 1880's but recent records are missing in the southern part of the Navajo Country.

AMERICAN RAVEN . . . *Corvus corax sinuatus*

A permanent resident of the Navajo Country, more or less unrestricted as to habitat.

Specimens: Adult ♂, June 15, 1933, Tsegi Canyon, 6500 feet (MVZ). Adult ♀, July 11, 1934, 5900 feet, one mile west of Kayenta, Navajo County, Arizona (MNA). Adult ♂, July 12, 1934, 6850 feet, Transition Zone, Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♀, August 3, 1934 (skeleton), 6700 feet, Dogoszhi Biko, Tsegi Drainage, Navajo County, Arizona (MNA). Partial skeletons from Betatakin and Kiet Siel pueblo ruins (700 to 1300 A.D.) and from Awatovi ruins (1500 to 1700 A.D., Hargrave 1939:209) and from Awatovi ruins (1400 to 1600 A.D., J. O. Brew, letter).

Observations: The reports of skeletal remains (Hargrave and Brew, *ibid*) seem to indicate that the Raven has inhabited the Navajo Country in round numbers at least a thousand years. The earliest direct observation seems to be that of Merriam (1890:94), who reported it common in the deserts but not on the mountains. He saw it along the Rio Puerco and Little Colorado rivers, on Tennebito (Dinnebito) Wash, August 12-19, and on the Moencopie Wash, September 20-27, 1889. W. L. Dawson, traveling on the Santa Fe R.R. July 2, 1900, saw several by twos and threes "after we passed into Arizona" going west toward Flagstaff. Loring reported it common around Bluff and Noland's Ranch, Utah, November 8-27, 1893. Fisher (1903:35) reported it was, because of its great fondness for corn and melons, very troublesome to the Mokis in the vicinity of Keams Canyon in late July, 1894. Hundreds congregated on cliffs near the gardens which they quickly ravaged if the old women guards relaxed their vigilance between dawn and dusk. Within the decade 1931-40, there are many records by Wetherill, Hargrave, Benson, Phillips, Jenks, Stevenson, Russell, Woodbury and Monson that cannot be detailed here. They occur in nearly every month in the year and in great variety of habitats and places. Monson says it is common over the entire reservation.

Distribution: The raven is a common conspicuous bird in the Navajo country. Being no respecter of altitudes or distances, the birds are found almost everywhere. The fact that they are sacred to the Navajos may have something to do with their common occurrence. They are usually found singly or in small groups, but occasionally in flocks. Twice during July, 1938, flocks estimated at 30 and 50 were encountered. We have no data regarding the breeding dates in this region, but think the flocks must have contained at least some young birds of the year. On one occasion they were found feeding in a loose flock formation and moved forward a few at a time as we approached. In the other case they were circling in the air, rising higher and higher. The birds were observed at nearly all altitudes from 3200 feet on the Colorado River to 10,000 feet on Navajo Mountain and were seen in many types of habitat, canyons, flats, ponds, pigmy forests and larger forests. It is undoubtedly a permanent resident, although there may be some winter shifting of the population.

WESTERN CROW . . . *Corvus brachyrhynchos hesperis*

An uncommon but sometimes numerous visitant to the area, probably migrant. Monson thinks it may breed in the Lukachukai Mountains, where he says it is common on the New Mexico side of the line in summer.

Specimens: Adult skeleton, March, 1937, 5860 feet, Kayenta, Navajo County, Arizona (MNA).

Observations: February 23, 1938, near St. Michaels, flock of 120 (GM). April 12-13, 1937, near Kaibito, one and two seen flying (GM). April 12, 1934, Kayenta, Arizona, flock of six seen (MAW). June 20-21, 1933, between Querino Canyon and St. Michaels, Arizona, fairly large flocks in open spaces (RJ). August 11, 1938, Ganado Lake, two seen (GM). October 23, 1934, Betatakin Canyon, a flock of 17 seen at 4:45 (MAW). November, 1937, Kayenta flock of five from which one specimen was taken by John Wetherill (MAW).

PINON JAY . . . *Cyanocephalus cyanocephalus*

A permanent resident of the pigmy conifers, often straying over the open sage flats within the confines of this scrub forest, but seldom leaving its limits. A definite obligate inhabitant, characteristic of this habitat.

Specimens: ♂, May 19, 1892, near Bluff, San Juan County, Utah (AMNH). Adult ♂, June 16, 1934, pigmy conifers, Marsh Pass, Navajo County, Arizona, 6500 feet (MNA). June 26, 1927, Whiskey Creek, Tunicha Mountains, Arizona, 6500 feet, series of specimens (USBS, Cantwell and Trapier). Adult ♀, July 10, 1935, 6800 feet, pigmy forest, Long Canyon near its mouth, Tsegi drainage, Navajo County, Arizona (GC). Juvenile ♂, July 19, 1894, Keams Canyon, Arizona (Fisher, USBS). Adult ♂, July 31, 1936, 6500 feet, pigmy forest, seven miles south of Navajo Mountain Trading Post, Coconino County, Arizona (UU). Adult ♂, August 1, 1935, 6200 feet, pigmy forest, Marsh Pass, Navajo County, Arizona (GC). Adult ♂ and immatures, August 2, 3, 1937, 7000 feet, pigmy forest, Kaiparowits plateau (UU).

Observations: Rowley first reported this jay May 19, 1892, near Bluff, Utah, but how close or in what habitat is not indicated. Fisher (1903:35) encountered it almost daily in the pigmy conifers on the mesas around Keams Canyon during the last half of July, 1894. No further records are available

until June, 1927, when Cantwell and Trapier found it in Whiskey Creek in the lower portions of Tunicha Mountains, Arizona. Since that time many records are available from Wetherill, Benson, Hargrave, Russell, Woodbury and Monson, well distributed through the year. The birds are nearly always reported in flocks ranging from a few up to a hundred, and the reports come from nearly all parts of the pigmy conifers wherever observers have been stationed.

Discussion: These blue-colored jays, distinguishable from the Woodhouse Jays by the shorter tail, longer bill, raucous call and flocking habits, are so characteristic of the pigmy conifers that this scrub forest may be considered as an ecological magnet that binds them to it. They find food of pine nuts, juniper berries and insects, shelter, nesting sites and nesting material suitable to their needs the year around in this habitat and have little occasion to leave it very far or very long at a time. Observations of these birds are available for nearly every month of the year, with certain exceptions when observers were not present. The observations abound in all parts of the area wherever observers have been among the pigmy conifers. This includes the Kaiparowits Plateau, Navajo Mountain and the surrounding mesas and canyons in Utah, usually above 5200 feet; the Tsegi canyons and mesas, the Black Mesa, and the higher parts of Monument and Kletthla Valleys in Arizona. Monson states they are "common in Upper Sonoran Zone woodland." He found a flock of 35 on April 17, 1937, near the Copper Mine, of which about one-third were juveniles just out of the nest. This appears to indicate the time of nest-leaving, which would throw the nest-making and incubation periods back as early as March. Juveniles easily distinguishable from the adults have been taken as late as August 3. Woodbury encountered a flock on Kaiparowits Plateau on August 4, 1937, estimated to contain 100 birds, containing a mixture of adults and juveniles.

CLARK NUTCRAKER . . . *Nucifraga columbiana*

Probably a permanent resident of the spruce-fir forests of the higher altitudes, but forages down the slopes as low as the pigmy conifers.

Specimens: Adult ♀, June 20, 1934, Water Lily Canyon, Tsegi drainage (MNA). Adult, June 24, 1936, 6500 feet, pigmy conifers, Tsegi Canyon near Marsh Pass, Navajo County, Arizona (UU). Adult ♀, July 3, 1935, 8500 feet, ponderosa pines, near War God Spring, Navajo Mountain, San Juan County, Utah (UU). Adult, July 10, 1936, 3450 feet, Bridge Canyon, three miles below Rainbow Bridge, San Juan County, Utah (UU). July 13, 1933, War God Spring, Navajo Mountain, Utah (MVZ 64986). Immature ♀, July 13, 1936, 3200 feet, cottonwoods in Colorado River side canyon next below Bridge Canyon, San Juan County, Utah (UU). July 13, 1933, War God Spring, Navajo Mountain, Utah, 9000 feet (MVZ). Adult ♀, July 14, 1936, 10,000 feet, spruce-fir forest, near top of Navajo Mountain, San Juan County, Utah (UU). Adult ♀, August 4, 1936, 6100 feet, pigmy conifers near mouth of Tsegi, near Marsh Pass, Navajo County, Arizona (GC). Adult ♀, August 14, 1935, 9000 feet, ponderosa pines, SW of Navajo Mountain, San Juan County, Utah (GC).

Observations: All available records occur in the years 1933-38, and in the regions including Navajo Mountain, Tsegi drainage and Black Mesa. Phillips says that "the fall of 1935 witnessed a heavy invasion of nutcrackers, some of which probably remained in places not normally inhabited by the species for nearly a year. Therefore, in determining normal status, records

between August, 1935, and July, 1936, inclusive, must not be considered." Recorded observations tend to corroborate his statement. At least there seems to have been an unusually large number of birds at that time. Records of available observations are here given, divided into the two groups:

June 13-20, 1933, Navajo Mountain: seen and heard every day between June 13 and 20 on Navajo Mountain, in the ponderosa pine and spruce zones. They were most numerous near the summit of the mountain. One was collected June 15 at War God Spring (Benson, 1935). June 19, 20, 1934, Water Lily Canyon: flock of 20—one specimen (LH). June 25, 1938, Marsh Pass: a single bird in afternoon (HNR). August 2, 4, 5, 6, 8, 9, 11, 1936, Beaver Creek Canyon, north foot of Navajo Mountain, chiefly pigmy conifer slopes: two to six birds each time—as low as 5500 feet (HNR). August 13, 1936, Navajo Mountain, San Juan County, Utah: observed at least 40 (HNR).

Records of August, 1935, to July, 1936: August 3, 1935, Black Mesa above Marsh Pass; on the very rim of the mesa six of these birds were found in the pigmy forest and followed for an hour or more. They were noisy and restless but stayed very close to the crest of the rim (HNR). August 29, 31, 1935, Betatakin Canyon: noted (MAW). September 3-7, 1-16, 18-23, 29, 30, 1935, Betatakin Canyon: noted daily, sometimes a large number (MAW). October 1-4, 6-7, 10-18, 21-28, 1935, Betatakin Canyon: noted daily (MAW). April 5, 1936, Betatakin Canyon: several pairs (MAW). May 1, 19, 1936, Betatakin Canyon: a single bird and quite a number seen (MAW). June 30, 1936, Marsh Pass, Navajo County, Arizona, 6500 feet, pigmy forest: six birds in late afternoon came down from Black Mesa to drink (HNR). July 1-23, 1936, Navajo Mountain, San Juan County, Utah: observed daily—at least 40 each day—most conspicuous in Canadian and Transition Zones, but straying down into the pinon forests (HNR). July 10, 13, 1936, Bridge Canyon, NW foot of Navajo Mountain, down to 3400 feet: small flocks (Lyons). July 26, 28, 1936, NE foot of Navajo Mountain, 6500 feet: one each day in pines (HNR).

Discussion: The Nutcracker has been observed principally on Navajo Mountain, Black Mesa and in the Tsegi Canyons, especially at Betatakin. It appears to be at home in the spruce-fir forests of the higher altitudes but is a frequent visitor down the slopes as low as the pigmy forests, going down after both food and water. It has been seen in Bridge Canyon as low as 3450 feet and in Tsegi Canyon drinking as low as 6100 feet. We have no data on the breeding habits of the bird in this area, but it is probable that the young are out of the nest long before our parties reach the field. The large numbers found in 1935-6 may be interpreted as an invasion, but there is another possible alternative interpretation that it may have been due to a peak in numbers of the resident population. The birds have been observed in much smaller numbers on Black Mesa, Tsegi canyons and Navajo Mountain in other years.

PALLID BLACK-CAPPED CHICKADEE . . . *Parus atricapillus nevadensis*

This bird is known only from the observations of and specimen taken by Wetherill in Betatakin Canyon during October, 1936. Presumably a migrant. It is not the common chickadee in the Navajo Country.

Specimens: Adult ♂, October 23, 1936, Betatakin Canyon, Navajo County, Arizona, 6800 feet (MNA Z8.838). (New record for Arizona.)

Observations: October 4, 10, 13, 23, 24-26, 1936, Betatakin Canyon: noted every day and 10 were seen on the 23rd from which the specimen was taken (MAW).

Notes: Monson has an observation record of this species at Farmington New Mexico, on San Juan River.

References: Wetherill. Milton: 1937. Long-tailed Chickadee in Arizona Condor 39:86, refers to MNA Z8.838. Linsdale, Jean M., 1938, Geographic Variation in Some Birds of Nevada; Condor, 40:36-38.

MOUNTAIN CHICKADEE . . . *Parus gambeli gambeli*

A permanent resident of the pigmy forests, the oaks, ponderosa pines, the aspens and spruce-fir forests.

Specimens: Adult ♀, and ♂. January 23, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). Adult ♀, June 25, 1938, 7500 feet, pigmy forest, near Marsh Pass, Navajo County, Arizona (UU). ♂, June 27, 1933, Skeleton Mesa, 8000 feet (MVZ). Adult ♂, July 10, 1935, 6700 feet, pigmy conifers near mouth of Long Canyon, Tsegi drainage, Navajo County, Arizona (UU). Immature ♀, July 10, 1936, 8500 feet, aspens, Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). ♂ ♂, August 5, 6, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau, Kane County, Utah (UU). Adult ♂, August 12, 1935, 9500 feet, ponderosa pines near War God Spring, Navajo Mountain, San Juan County, Utah (UU).

Discussion: This chickadee is one of the commonest and most characteristic birds of the pigmy conifers but also ranges upward into the oaks, ponderosa pines, aspens and spruce-fir forests. Its conspicuous call notes make its presence known, when otherwise it might be overlooked. It has been observed on Navajo Mountain, Black Mesa and Skeleton Mesa and in many canyons especially in the Tsegi drainage (Betatakin, Long, Kiet Siel, Dogoszhi Biko, Bat Woman, Water Lily, etc.), and in many of the pigmy forests of the flats, benches and ridges almost everywhere. The observations available to us are well distributed through the year but are especially numerous in those months when intensive studies have been conducted. It is undoubtedly a permanent resident, but may exhibit some altitudinal migration. Elsewhere in Utah (Woodbury) and Arizona (Phillips) it appears to breed among the coniferous forests of the mountain tops and migrate to lower levels in winter, but in the Navajo Country the evidence available seems to indicate strongly that it is a common breeder in the pigmy conifers where it probably winters also. Out of approximately 70 observation records available the great majority come from the pigmy conifers, but some of them come from areas in which oaks, pines or even firs occur in isolated patches. However, nests have been found in juniper and pinyon pine trees. In addition, families out of nest have been seen several times and larger flocks probably containing several families have been found many times in the pigmy conifers without admixture of oaks or larger conifers.

Breeding Notes: Wetherill noted on April 11 that they "are mating." Hargrave reports finding a nest with young on June 21, 1933, and in the same nest a year later, June 21, 1934. He also saw a pair of adults at a hole in a juniper tree on June 22, 1933, apparently nesting, and found a nest containing young in a pinyon pine on Skeleton Mesa June 30, 1933. Russell noted an adult feeding young out of nest in Bubbling Springs Canyon on June 30, 1935. He reported the birds numerous and evenly distributed on Navajo Mountain on July 1, 1936, but a week later the young were out of the nest and going around in family flocks. Our observations in 1938 supplementing the foregoing indicate that the birds were well scattered territorially in late June, but were gathered in small family flocks in early July. Later, they were in larger flocks and often in mixed flocks with other birds, especially gray titmice and

lead-colored bush-tits, but often accompanied by nuthatches, Bewick wrens, black-throated gray warblers and others. Such concentrations in mixed flocks gives the forest the appearance of being deserted unless one of the flocks is encountered, when the forest looks as if it were full of birds. The chickadees with their conspicuous call notes appear to be the "bell wethers" of the flocks.

GRAY TITMOUSE . . . *Parus inornatus griseus*

A permanent obligate resident of the pigmy conifers, gathering in family flocks during late summer and fall, occasionally joining mixed flocks at this time.

Specimens: Specimen, mid-May, 1858, Fort Defiance (Baird (1861:6)). Adult ♀, June 14, 1933, 6000 feet, Tsegi Canyon (MVZ). Immature ♀, June 25, 1934, 6750 feet, Dogoszhi Biko, Navajo County (MNA). Adult ♂, July 6, 1935, 6500 feet, pigmy conifers in Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (UU). Adult ♂, July 10, 1935, 6700 feet, pigmy conifers in mouth of Long Canyon, Tsegi Drainage, Navajo County, Arizona (UU). Adult ♀, July 4 and 6, 1938, 6500 feet, pigmy conifers near Marsh Pass, Navajo County, Arizona (UU). Immature, July 26, 1936, 6500 feet, pigmy conifers, Navajo Mountain Trading Post, San Juan County, Utah (UU). Juvenile ♂ and ♀, July 31, 1937, 7000 feet, pigmy conifers, Kaiparowits Plateau, Utah (UU). Adult ♂, August 3, 1934, 6800 feet, pigmy conifers in mouth of Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♂, August 12, 1937, pigmy forest, Kaiparowits Plateau, Kane County, Utah (UU).

Observations: This titmouse was first found in the Navajo Country somewhere near Fort Defiance by Mollhausen in May, 1858. It was observed at Keams Canyon by Fisher, July 17-31, 1894 (1903:36). Nelson saw "a few" in the pigmy conifers on the west side of Defiance Mountains in early August, 1909. Hargrave saw several in the pigmy conifers at Hotevilla, October 14, 1931. Benson (1935:443) found it on the mesa in Arizona five miles SE of Navajo Mountain, Utah, June 25, 1933. Milton Wetherill noted it mostly in the pigmy conifers, usually several times per month and nearly every month in the year during the years 1934 to 1936 in the Tsegi drainage, mostly in Betatakin and Kiet Siel canyons. Monson has 37 notations of its occurrence in many places through the heart of the Navajo Country. These observations were well distributed through 11 of the 12 months during the years 1936 to 1939. Our R.B.-M.V. expeditions produced 55 records mostly distributed through the summer months of June, July and August and during the years 1933 to 1938. So far as noted the birds were always found in the pigmy conifers.

Distribution: The Gray Titmouse is confined almost exclusively to the pigmy conifers, so much so that it is regarded as an obligate bird in this habitat. It has been observed in many places, too numerous to mention, from Preston Mesa on the west to Defiance Mountains on the east and as far north as Kaiparowits Plateau, Utah. The records are well distributed through every month in the year. It is undoubtedly a permanent resident. There is probably little, if any, migration, but there seems to be some bunching or flocking in fall and winter.

Breeding Notes: During the winter and spring it is usually found distributed one or two in a place as though it were either solitary or in solitary pairs. During the nesting season it is undoubtedly territorially distributed although we have no nesting records, but Monson found birds singing and

carrying nesting material on April 10 and 14, 1937. We have several records of birds seen in small groups which were interpreted as family flocks during early July, hence we assumed that the broods were emerging about that time. This interpretation was corroborated by specimens of immature individuals taken June 25, July 26 and 31, and by observation of a pair at Marsh Pass which brought young off the nest during the last week in June, 1938. Family flocks were common during July and sometimes these were joined by other birds such as chickadees, bush-tits and others to make mixed flocks which were not uncommon in late summer.

Singing notes: The Gray Titmouse has a puzzling variety of sweet notes and songs that make it difficult to distinguish with certainty. Woodbury followed a lone female (UU 4255 ♀) through the pigmy conifers for a couple of hours on July 6, 1938, in an effort to delineate its calls and recorded the following seven types, rendered phonetically in English, which list is probably incomplete:

1. Kiva (kee va), kiva, kiva, kiva.
2. Perty, perty perty, perty.
3. Chew-chew-chew, or chew-chew-chew-chew.
4. Kuta-kuta-kuta-kuta, close together.
5. Perty bird-perty bird-perty bird, short close.
6. A whistling or flute-like melody, unable to record.
7. Several shorter or lesser syllables.

LEAD-COLORED BUSH-TIT . . . *Psaltiriparus minimus plumbeus*

A permanent resident of the pigmy conifers gathering into small flocks of 10 to 30 birds during late summer and fall.

Specimens: ♂, June 5, 1927, pigmy conifers, 30 miles north of Oraibi, 6500 feet (Cantwell, USBS). ♀, July 2, 1927, near Bluff, San Juan County, Utah (BYU). Immatures, July 6, 1938, 6000 feet, pigmy conifers near Marsh Pass, Navajo County, Arizona (UU). Adult ♂, July 7, 1935, 6500 feet, pigmy forest, Tsegi drainage, Navajo County, Arizona (UU). Adult ♂, July 8, 1936, 8000 feet, pigmy forest, southwest side of Navajo Mountain, San Juan County, Utah (UU). Immature, July 11, 1938, pigmy forest, Black Mesa, near coal mine, Navajo County, Arizona, 6700 feet (MNA). Adult, July 15, 1935, 7200 feet, pigmy forest, mesa just west of Bubbling Springs Canyon, Tsegi drainage, Navajo County (UU). Adult ♂, July 24, 1936, 6500 feet, pigmy forest, near Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult ♀, July 31, 1936, 6500 feet, sagebrush, Navajo Mountain Trading Post, Coconino County, Arizona (UU). Immature, July 31, 1936, 6500 feet, sagebrush, Navajo Mountain Trading Post, Coconino County, Arizona (UU). Juvenile, August 1, 1937, pigmy forest, Kaiparowits Plateau, Utah, 7000 feet. Adult ♂, August 14, 1935, 9500 feet, sagebrush and scattered pigmy conifers, SW side of Navajo Mountain, San Juan County, Utah (UU). Type specimen, December 18-20, 1853, Little Colorado River near Leupp about 30-35 miles NW of Winslow (Kennerly and Mollhausen).

Observations: Kennerly and Mollhausen first found this bird about 35 miles down the Little Colorado River from Winslow, Arizona, in December, 1853. It was probably in the streamside forest. Fisher (1903:36) saw it at Keams Canyon in late August, 1894. Cantwell (USBS) found it in the pigmy conifers 30 miles north of Oraibi, June 5, 1927. Cottam found it a month later near Bluff, Utah, July 2, 1927. Phillips saw a flock in the greasewoods

near the mouth of Tsegi Canyon, August 13, 1936. Wetherill noted it almost daily at Betatakin Canyon during many months in years 1935-36. Monson has 18 records from many places through the heart of the Navajo Country from Tuba City eastward toward Defiance. They are well scattered through the months of January, June to August and October to December. Hargrave, Russell and Woodbury (R.B.-M.V. expeditions) have over 40 records during summer months from June to August scattered through the region from the Tuba-Kayenta road northward to the Colorado River.

Distribution: This tiny long-tailed bird, in a garb as drab as that of the titmice, is a permanent resident of the pigmy conifers, but also appears to overflow the limitations of that forest and sometimes ranges out into the sagebrush openings in the forest, downward into streamside trees of the valleys or upward in mountains into the oaks and yellow pines and even into the spruce-fir forest of the Canadian Zone. Phillips thinks there is evidence to indicate migration at Tuba City and perhaps on Little Colorado River.

It has been recorded from Black Mesa, Skeleton Mesa, Tyende Mesa, Marsh Pass, and many places in the Tsegi canyons, all in Arizona, and Navajo Mountain and its vicinity in Utah, as well as many places from Tuba City eastward toward New Mexico. There appears to be no reason why it should not be found throughout the pigmy conifers of the Navajo Country. It is usually found in flocks throughout the year except during the nesting period when it is territorially distributed. Our records do not show nesting dates but the broods appear to be emerging from the nests in late June and early July. Thereafter, we begin to find flocks of varying sizes, usually larger than one family, possibly ranging from two to five families, judging from the estimates of flock sizes in our records. Occasionally they appear along with chickadees, titmice and other birds in mixed flocks, although more often they are found by themselves. Whether this means that they are more or less independent and other birds join and follow them is not clear. If so, the constant chattering of the bush-tits may be the signal that draws the other birds.

Classification: Some of the individuals have dark faces (UU 4240-41). These represent the variation once distinguished as *santaritae* by Ridgway. Our birds are assigned to *plumbeus* despite the black faces of some individuals because the color of the back is typical and not nearly as light as any of the specimens of *lloydi*.

ROCKY MOUNTAIN NUTHATCH . . . *Sitta carolinensis nelsoni*

A permanent resident of the pigmy conifers, yellow pines and spruce-fir forest. **Specimens:** Skin, June 26, 1933, Skeleton Mesa, 8000 feet, about 17 miles NW of Kayenta, Arizona (MVZ). Immature ♂, July 5, 1938, pigmy forest, near Marsh Pass, Navajo County, Arizona, 6800 feet (UU). Adult ♀, July 10, 1935, pigmy forest, near mouth of Long Canyon, Tsegi drainage, Navajo County, Arizona, 7200 feet (GC). Adult ♀, July 16, 1938, 7300 feet, pigmy forest, Black Mesa near Coal Mine, Navajo County, Arizona (UU). Adult ♂, July 24, 1934, 7800 feet, pigmy forest, Skeleton Mesa, Navajo County, Arizona (MNA). Immature ♀, August 3, 1934, 6450 feet, pigmy forest, Dogoszhi Biko, Navajo County, Arizona. Adult ♀, August 13, 1935, 9000 feet, Transition Zone, War God Springs, Navajo Mountain, San Juan County, Utah (GC).

Observations: This nuthatch was found in the ponderosa pines between Fort Defiance and Chin Lee by Nelson about July 31, 1909, and by Skinner, September 27, 1916, when he saw 10 or 12. Goldman noted it in the Tunicha

Mountains about August 22, 1917, and Cantwell found it in the same mountains ten years later, June 19-26, 1927. Benson (1935:445) recorded it in the coniferous forest on Navajo Mountain, June 13-20, 1933. Wetherill found it in Betatakin Canyon on many days in the months from March to September in 1934-6. Monson has 14 records of observations during the months of February, June, October, November and December in the years 1936-8. The records come from Defiance Plateau, Bahlakai Mesa, Roof Butte, Red Rock, Pinon, Keams Canyon and Black Mesa. The R.B.-M.V. expeditions provided 32 records during the months June to August in years 1933-38. It was observed on Navajo Mountain, both upper and lower slopes, on Black Mesa, Skeleton Mesa, near Marsh Pass and in the Tsegi canyons.

Discussion: This nuthatch is a regular though not an abundant inhabitant of the pigmy forest, the yellow pines, and more sparingly of the spruce fir forest. It probably occurs all through the denser stands of the pigmy conifers, and probably spreads to streamside cottonwoods in winter. Wetherill records these birds as mating on April 13. Courting, nesting and feeding young probably proceed through late April, May and June so that the young birds leave the nest about the first of July. The records indicate the observations of single birds up to this time and the occurrence of small family flocks after that date (July 5, 11, 12, 19). An adult female with new feathers growing on brood patch was taken July 16. On the same day several were seen in mixed flocks with titmice and other birds.

RED-BREASTED NUTHATCH . . . *Sitta canadensis canadensis*

Probably a breeder of the spruce-fir forest of mountain tops and possibly also of the small patches of coniferous forest in canyon heads, spreading irregularly in late summer or fall into other wooded areas.

Specimens: Adult ♂, July 2, 1936, Kerley Trading Post one or two miles SW of Tuba City, Coconino County, Arizona (MNA). Juvenile ♀, July 14, 1936, 10,400 feet, spruce-fir forest on top of Navajo Mountain, San Juan County, Utah (UU 4248). Immatures, August 10, 1934, Douglas fir, Dogoszhi Biko, 7000 feet, Tsegi Canyons, Navajo County, Arizona (MNA). August 11, 1937, 7000 feet, aspens on Kaiparowits Plateau, Kane County, Utah (UU). Adult, August 15, 1935, 10,000 feet, Engelmann spruce, top of Navajo Mountain, San Juan County, Utah (GC).

Observations: Benson (1935:445) found several birds in the dense spruce-fir forests at 10,000 feet on Navajo Mountain in company with chickadees, June 18-20, 1933. Wetherill saw it sparingly in the oaks and firs in Betatakin Canyon in late summer and fall (August to October) in 1935-6. Russell found it in the spruce-fir forest on Navajo Mountain July 6 and 13-18, 1936, from one to six birds each day. He also found it in the firs in the head of Dogoszhi Biko, August 19, 1934. Teall saw one in Water Lily Canyon, August 12, 1934, and Monson saw one at Pinon, November 8, 1938.

Comment: This little bird is at home in the spruce-fir forests of mountain tops and canyon heads. It is known to occur in such forests on Navajo Mountain and undoubtedly occurs in similar forest in the Tunicha and Lukachukai mountains. It has been observed sparingly in the Tsegi drainage canyon heads and occasionally elsewhere. It no doubt breeds in the spruce-fir forests of the mountain tops in June and July and begins to spread during August and may thereafter be found sparingly in other places and possibly other habitats, such as canyon heads pigmy conifers and streamside cottonwoods. The male in breeding condition taken by Phillips in cottonwoods near Tuba

City, July 2, 1936, was probably only an accidental. There is no evidence to indicate that it was breeding there.

BLACK-EARED NUTHATCH . . . *Sitta pygmaea melanotis*

A resident of the ponderosa pines and more sparingly in adjacent pigmy conifers, usually between 7500 and 9500 feet.

Specimens: ♂, June 29, 1933, 8000 feet, Skeleton Mesa (MVZ). Adult ♀, July 10, 1936, 8500 feet, ponderosa pines, near Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Adult ♀, July 21, 1936, 8000 feet, ponderosa pines on SW slope of Navajo Mountain, San Juan County, Utah (UU). Immature ♂, July 22, 1934, 7800 feet, pigmy forest on Skeleton Mesa, Tsegi drainage, Navajo County, Arizona (MNA). Juvenile ♀, August 11, 1935, ponderosa pines, SW side of Navajo Mountain, San Juan County, Utah, 8500 feet (GC).

Observations: Nelson found "a few" in the ponderosa pines 20 miles NW of Fort Defiance about August 1, 1909. Goldman reported it in the pines of Tunicha Mountains, August 23, 1917. Benson (1935:445) observed it daily in the ponderosa pines but not in the spruce-fir forest on Navajo Mountain, June 12 to 20, 1933. Hargrave found it common in the pigmy conifers on Skeleton Mesa, June 25 to July 2, 1933, and found a nest with seven young in a pinyon pine on June 25. Russell reported it very common or abundant in the ponderosa pine forest but not in spruce-fir on Navajo Mountain, at intervals from July 1 to August 13, 1936, mainly between 7500 and 9500 feet. He found adults feeding well grown young on July 4. He also noted several in the firs near Spruce Spring on the mesa above Bubbling Springs Canyon, July 15, 1935, and in the ponderosa pines on Black Mesa 2-5 miles west of Coal Mine, July 11 and 16, 1938. Monson saw four on Defiance Plateau near St. Michaels, February 10, 1938, four on September 12, 1938, and one October 7, 1936; 33 at the Sawmill on Defiance Plateau, October 1, 1936; 32 at Roof Butte, October 20, 1937, and 43 on the 26th.

Discussion: This small nuthatch is at home principally in the yellow pines, but is found more sparingly in the higher parts of adjacent pigmy forest, but does not seem to have spread to either higher or lower altitudes, being quite definitely limited between 7500 and 9500 feet and mostly between 8000 and 9000 feet. Available records lie mostly between June 24 and October 26, but there is one in February indicating that it remains the year round. It has been reported from Navajo Mountain, Black Mesa, Skeleton Mesa, from the Tsegi canyons wherever yellow pines occur in quantity, from Tunicha Mountains and Defiance Plateau. A nest in a pinon pine containing seven young birds was reported by Hargrave on Skeleton Mesa on June 25. Russell reported adults feeding well-grown young on July 4. Evidently the young birds are out of the nest soon after this time. They gather in flocks thereafter, and their chattering calls may be heard from dawn till dusk as they travel through the yellow pines in companies containing as many as 50 birds.

ROCKY MOUNTAIN CREEPER . . . *Certhia familiaris montana*

A summer resident of the high spruce-fir forests of the mountains and probably a wintering bird in pigmy conifers of lower altitudes.

Specimens: Adult ♀, January 23, 1934, 7000 feet, in a cliff-shaded cove opposite Kiet Siel Cave, Navajo County, Arizona (MNA). ♂, June 19, 1927, Lukachukai Mountain, Apache County, Arizona (USBS). Adult ♀,

August 12, 1935, 9000 feet, ponderosa pines near War God Spring, Navajo Mountain, San Juan County, Utah (UU).

Observations: June 18, 1933, Navajo Mountain, Utah: one at 10,000 feet in the dense forest. This was the only one seen on the mountain (SBB). June 24, 1938, Roof Butte, one seen (GM). July 6, 1936, Canadian Zone cap of Navajo mountain, spruce-fir forest; males singing in two places (HNR). July 13-18—August 13, 1936, Canadian Zone cap of Navajo Mountain, spruce-fir forest; one to three birds each day (HNR). July 13, 22, 1936, War God Spring, Navajo Mountain, pine forest: one bird (HNR). October 23, 1936, Betatakin Canyon: "first I have seen in two years" (MAW). October 26, 30, 1936, Betatakin Canyon: noted (MAW). November 8, 1938, Pinon, Navajo County, Arizona, one seen (GM).

Discussion: This inconspicuous bird is found in the summer time, chiefly in the spruce-fir forests of the mountain tops, although it is also found among the yellow pines at slightly lower altitudes. In October it has been observed in Betatakin canyon. November and January records indicate that it may be wintering in lower altitudes.

DIPPER . . . *Cinclus mexicanus unicolor*

Resident along the stream in Bridge Canyon, northwest of Navajo Mountain and along Lukachukai Creek in Lukachukai Mountains; perhaps elsewhere. It does not occur on Navajo mountains nor in the Tsegi canyons. Very definitely limited in its distribution.

Observations: June 22-24, 1933, Bridge Canyon, Utah. Observed several times at the pools near Rainbow Bridge. They seemed out of place in such hot surroundings, but the fish in the pools assured a bountiful food supply (Benson, 1935). June 24, 1928, one in Lukachukai Creek in Apache County, Arizona (Monson (1939:168)). July 6, 1933, Bridge Canyon Utah, seen several times (LH). 1934, noted in Bridge Canyon (HNR). August 7, 1935, Bridge Canyon, Utah, one record (HNR).

WESTERN HOUSE WREN . . . *Troglodytes aedon parkmani*

A summer resident of leafy bushy thickets.

Specimens: Adult ♀, April 27, 1935, near Bluff, San Juan County, Utah (UU). Adult ♂, July 9, 1936, 8500 feet, *Ceanothus* and manzanita thicket in pine forest, War God Spring, Navajo Mountain, San Juan County, Utah (UU). Three skins, June, 1927, Lukachukai Mountains (Cantwell, USBS). ♂, July 14, 1933, 9000 feet, War God Springs, Navajo Mountain, San Juan County, Utah (MVZ). ♀, June 25, 1927, Wheatfield Creek, Tunicha Mountains (Cantwell, USBS). Immature ♀, July 26, 1935, 6900 feet, rose thickets and oak, Kiet Siel Canyon at the cliff dwelling, Tsegi drainage, Navajo County, Arizona (UU). Adult ♀, August 16, 1935, 9000 feet, rose thicket in ponderosa pine forest, War God Spring, SE side of Navajo Mountain, San Juan County, Utah (UU).

Observations: Merriam (1890:100) found this bird common in the bushes bordering the Little Colorado not far from what is now Cameron September 20 and 27, 1889. Cantwell (USBs) found it in the bushes of Lukachukai Mountains and on Wheatfield Creek in Tunicha Mountains. Benson (1935:445) noted it June 12-20 on Navajo Mountain, where it was seen daily near fallen trees in the ponderosa pine belt. Wetherill reported it at

Betatakin Canyon, May 21 and June 18, 1936, and near Kayenta Reservoir, November 29-30, 1941. A University of Utah expedition found it near Bluff, Utah, April 27, 1935. Russell (R.B.-M.V.) has many records on Navajo Mountain, July 1-23, 1936, where he found it common in thickets of the Transition Zone up to about 9500 feet. He and Hargrave have some records in the Tsegi Canyons in July, 1935, where the bird was much less numerous than on Navajo Mountain.

Discussion: The Western House Wren seems to be a summer inhabitant of leafy bushy thickets in the higher altitudes, usually above 6000 feet, where such thickets occur. Suitable habitats are mainly located on mountains, but a few occur in canyons, especially in places such as protected canyon heads. In 1935 special attention was directed to its habitat in the Tsegi Canyons. It was distinctly uncommon, occurring only where there was plenty of water and copious bushy leafy shade. This was provided in a few places by wild rose and gooseberry bushes, such as those near Ladder House in Long Canyon and near Kiet Siel Pueblo. A nest found July 10 containing young which left the next day indicates that the broods probably emerge in early July and that family flocks might be expected during that month. Wetherill's report of a bird near Kayenta Reservoir, November 20-30, 1941, is the latest seasonal record available.

DESERT BEWICK WREN . . . *Thryomanes bewicki eremophilus*

Breeder and probably permanent resident of the pigmy conifers.

Specimens: ♀, June 5, 1927, pigmy conifers 30 miles north of Oraibi (USBS, Cantwell). Adult ♂, ♀, June 25, 1938, 7000 feet, pigmy forest, near Marsh Pass, Navajo County, Arizona (UU). Immature ♂, ♀, June 26, 1934, 6750 feet, pigmy conifers, Dogoszhi Biko, Navajo County, Arizona (MNA). Adult ♂, ♀, and immature ♂, June 29, 30, 1938, 7500 feet, pigmy forest near Marsh Pass, Navajo County, Arizona (UU). Adult ♂ and immature ♀, July 1, 5, 1938, 7500 feet, pigmy forest near Marsh Pass, Navajo County, Arizona (UU). Juvenile, July 26, 1935, 7600 feet, Skeleton Mesa near Long Canyon, pigmy forest, Navajo County, Arizona (UU). Juvenile ♀, July 27, 1936, 6500 feet, pigmy forest, two miles north of Navajo Mountain Trading Post, San Juan County, Utah (UU).

Observations: Cantwell (USBS) found it in the pigmy conifers 30 miles north of Oraibi, June 5, 1927. Wetherill noted it in Betatakin Canyon, May 2, 28, July 21, 1936, and August 26, 1935. Monson has records of January 26, April 17, June 15, 16, 30, July 3, 14, August 28, 1937, and December 7, 8, 19 and 21, 1936, at the following places: Moenave, Copper Mine, Bahlakai Mesa, Jeddito, Hopi Buttes, Keams Canyon, Tonalea and Tuba City. R.B.-M.V. expedition observers (Hargrave, Teall, Russell, Woodbury) have found it on the lower slopes of Navajo Mountains, at Marsh Pass, on Black Mesa and several places in the Tsegi canyons on dates ranging from June 22 to August 9 in years 1934-38. Most of these records come from the pigmy conifers or from areas where pigmy conifers occur.

Discussion: This wren is a regular though not an abundant inhabitant of the pigmy conifers, seldom straying outside of that forest in summer, but sometimes doing so in winter. The song and the dark tail make it distinctive among wrens. Hargrave says "The adults seek food after the manner of warblers." Wetherill reports seeing a pair on May 2, 1936, one of which was building a nest; and on May 28 he located two nests that a female had started in a clump of scrubby oaks, but thought she had a third nest nearby that she

must be using. Monson found males singing as early as April 17 and Russell found singing males well distributed in late June. He remarked that they were not markedly excited near the nest, but singing well hidden in the trees tended to lead an intruder away. He found family flocks on July 1 and during early July. Just when the families disperse is not clear, but probably late July or August. Russell records seeing two to several birds in a place on July 31. When the mixed flocks of chickadees, titmice and bushtits gather in late summer, one or two of these wrens occasionally join the aggregations.

Classification: Russell compared our specimens with the types of *T. b. niceae* and extensive series from other areas. He found that the whole series of *niceae* were fresh plumaged birds, while those of the Chisos Mountains of Texas from which they were separated are nearly all worn. These latter came from an area not far from the typical range of *T. b. eremophilus*, and must be referred to that subspecies not only because of proximity but also because of brownish tails, absence of sharp contrast of gray upper tail coverts and rufescent lower back. However, they more than match the alleged grayness of *niceae*, and in the variation of white tips of the rectrices, three out of four birds have the alleged character of *niceae*. All of our specimens are referred to *eremophilus* on the basis of the brown tails, reduced white tips of tail feathers, and upper tail coverts. One male, which is the least worn specimen, shows tendencies toward the alleged character of *niceae*, further evidence that it is untenable.

WESTERN MARSH WREN . . . *Telmatodytes palustris plesius*

A fall migrant, stopping at the ponds in the Navajo country where cat-tails or rushes grow thick enough to offer protection. They have been found only in Kayenta, Polacca and Tuba City areas.

Specimens: Immature ♀, August 13, 1938, 5400 feet, marshes, Pasture Canyon, Tuba City, Coconino County, Arizona (UU). Immature, September 6, 1938, 5200 feet, among weeds in abandoned field, three miles SW of Tuba City in Moencopi Wash, Coconino County, Arizona (HNR).

Observations: August 13, 1938, 5400 feet, Pasture Canyon and vicinity, 3 seen (AMW). August 19, 1938, 5300 feet, marshes west of Kayenta, 1 seen (AMW). September 6, 1938, 5300 feet, Moencopi Wash below Tuba City, many seen (HNR). September 7, 1938, 5400 feet, upper lake, Pasture Canyon, 40 or more; lower marshes, 2 seen, 1 singing (HNR). September 22, 23, 1889, common in tall rushes in Tanner's Pond (in Pasture Canyon) north of Moencopi (Merriam 1890:100). October 13, 1938, Snake Butte southwest of Polacca, one seen (GM). December 7-8, 1936, Tuba City, one seen (GM). December 19, 1936, Tuba vicinity, one on Christmas Census (Monson 1937a:67).

CANYON WREN . . . *Catherpes mexicanus conspersus*

A permanent resident of the cliffs at almost any altitude.

Specimens: Immature ♀, June 24, 1934, 6850 feet, cliffs near oaks in Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♂, July 6, 1935, 6600 feet, rocks and pigmy conifers in Long Canyon near its mouth. Tsegi drainage, Navajo County, Arizona (GC). Adult ♀, July 15, 1935, 7100 feet, rocks and canyon rim on mesa west of Bubbling Springs Canyon. Tsegi drainage, Navajo County, Arizona (GC). Immature ♂, July 18, 1936, 3100 feet, Lee's Ferry, Coconino County, Arizona (UU). Juvenile ♀, July

21, 1937, 3200 feet, cliffs and brush on Colorado River near Rock Creek, Kane County, Utah (UU). Immature ♂, July 28, 1936, 6300 feet, two miles north of Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult ♂, August 2, 1936, 7000 feet, rim of Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). ♂, August 26, 1909, Lee's Ferry, north side (Nelson, USBS). Adult, August 6, 1935, rocks in pigmy conifers at southwest foot of Navajo Mountain, Coconino County, Arizona (GC). Skin, October 26, 1929, Bluff, Utah (MVZ). Specimen, October 27, 1931, Bluff, San Juan County, Utah (UU). ♀, November 13, 1893, Bluff, Utah (Loring, USBS).

Observations: Merriam (1890:100) found the Canyon Wren tolerably common along the cliffs of the Little Colorado River, August 12, 19, and September 20 and 27, 1889. Fisher (1903:36) saw it at Keams Canyon in late July, 1894. Nelson (USBS) found it at Lee's Ferry on the Colorado River, 3100 feet, August 26, 1909. Jenks reported one near a little natural bridge five miles SW of Fort Defiance, June 22, 1933, and he and Phillips reported three at Marble Canyon Bridge over Colorado River, August 2, 1933. Wetherill observed one wintering in Turkey Cave in Kiet Siel Canyon where he saw it almost daily, January 1 to April 19, 1934. He thought it also wintered in Betatakin Canyon because it was there when he left in the fall and when he returned March 1, 1935. He also noted it there almost daily through the rest of the year from March to October. Monson has records in January, February, June, August and December at Big Canyon west of Tuba City, Moenave, Toreva, Keams Canyon and Rat Springs NW of Tonalea, the latter place in open country away from rocks in late December. R.B.-M.V. expedition observers (Hargrave, Lyons, Teall, Russell and Woodbury) have many records, 6 in June, 25 in July and 21 in August in years 1934-38. They come from many places along the San Juan and Colorado rivers, many of the canyons around Navajo Mountain, and many places in Monument Valley, all in Utah: many places in the Tsegi canyons, cliffs in the Tuba City area, Black Mesa and Monument Valley, Arizona.

Discussion: The distribution of this bird is determined primarily by the location of cliffs of some size that bear cracks in which the bird can nest or retreat for protection. In the Navajo Country such cliffs occur wherever the geologic processes and the nature of the rocks provide. They are well distributed in nearly all altitudes, from 3100 to 10,000 feet. The Canyon Wren habitat seems to overlap that of the Common Rock Wren, but diverging from this overlap, each is distinct in its own niche, even though they more or less parallel each other in altitude. Whereas the Canyon Wren takes the higher and more spectacular rocky structures, the Rock Wren overlaps on the lower, less conspicuous ledges and becomes paramount in the smaller rocky outcrops and boulder strewn slopes. The Canyon Wren has been observed in many localities of both Utah and Arizona, and well distributed over the Navajo Country, but may be briefly summarized: Utah, in the Kaiparowits region, the San Juan and Colorado Rivers and Monument Valley; Arizona, in Monument Valley, Marsh Pass, Black Mesa, Tuba City vicinity, the Tsegi canyons, Toreva, Keams Canyon and elsewhere. Birds carrying food to nest have been observed May 9 and July 24. A family of six containing four young was noted June 22 by Hargrave. He also located a nest in a crack in the cliff on August 9, but could not get into the nest. He saw a bird at the nest on that day and again two days later, but he does not say that food was being carried. The observations are too meager to draw many conclusions, but it would seem that the scarcity of nesting records is due to nests being hidden securely in the cracks of the cliffs. Russell summarized his experiences of 1935 with this

bird thus: The Canyon Wren is the only really fine singer of this barren region and his clear bugle ringing out in a descending trill and echoing in cliffs as the refreshing coolness of sunset calms the breathless canyons, is music that lingers in our memories. This song was awaited with anticipation each evening and we were never disappointed.

COMMON ROCK WREN . . . *Salpinctes obsoletus obsoletus*

A breeding resident of the Navajo country in rocky outcrops and boulder strewn slopes of all altitudes; probably also wintering sparingly in the area, mostly at low altitudes.

Specimens: ♀, May 16, 1892, Bluff on San Juan River, Utah (AMNH). Adult ♂, March 23, 1934, Marsh Pass, Navajo County, Arizona (MNA). Specimen, mid-May, 1858, Fort Defiance, Arizona (Baird 1861:6). Immature ♂, June 28, 1935, 7500 feet, rocks in pigmy forest, Skeleton Mesa at mouth of Long Canyon, Navajo County, Arizona (GC). Adult ♂ and ♀, juvenile ♂, June 28, July 4, 1935, rocks in pigmy forest, Skeleton Mesa at mouth of Long Canyon, Navajo County, Arizona (GC). Adult ♂ and ♀, juvenile ♂, June 28, July 4, 1935, rocks in pigmy forest in Long Canyon near its mouth, Tsegi drainage, Navajo County, Arizona (GC). ♂, July 3, 1937, 4500 feet, desert rocks, Totempole, Monument Valley, Arizona (UU). Juvenile, July 4, 1937, 4500 feet, desert rocks, Gypsum Wash, Arizona (UU). Skeleton, July 5, 1937, 4500 feet, Monument Valley, desert rocks, Arizona (UU). Adult ♂, July 5, 1938, 6600 feet, edge of pigmy forest near Marsh Pass, Navajo County, Arizona (UU). Adult ♀, July 6, 1935, 6500 feet, rocks in pigmy forest, Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC). Skeleton, July 8, 1937, 4500 feet, desert rocks, Gypsum Wash (UU). Immature ♀, July 8, 1938, 6000 feet, rocks, near Kayenta, Navajo County, Arizona (UU). Juvenile ♀, July 13, 1936, 8500 feet, rocks in sagebrush on SW side of Navajo Mountain, San Juan County, Utah (UU). Juvenile, July 18, 1936, 3100 feet, talus slope, Ferry Swale, above Lee's Ferry, Coconino County, Arizona (UU). Nest only, July 19, 1938, 5900 feet, hole in cliff, Cow Springs Lake, Coconino County, Arizona (UU). Nest only, July 24, 1938, 5500 feet, hole in ledge near Red Lake, Coconino County, Arizona (UU). Adult, August 1, 1934, 6500 feet, pigmy conifers, Water Lily Canyon, Navajo County, Arizona (MNA). Juvenile ♂, August 8, 1936, 7000 feet, pigmy forest, east rim of Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♂, August 11, 1935, 8500 feet, rocks in sagebrush and manzanita in pine forest near War God Spring, Navajo Mountain, San Juan County, Utah (GC). Adult ♂, ♀, October 27, 1931, near Bluff, San Juan County, Utah (UU).

Observations: Mollhausen on the Ives Expedition (Baird 1861:61) found this wren near Fort Defiance about mid-May, 1858. Merriam (1890:100) reported it common about rocky outcrops on the Little Colorado Desert, August 12-19, 1889. Loring (USBS) found it common near Bluff, on the San Juan River, Utah, at the opposite side of the Navajo Country, November 8-15, 1892. Fisher (1903:36) saw it at Keams Canyon in the heart of the Country in latter part of July, 1894. Since 1900 records are too numerous to delineate. Monson has 135 records in the years 1936-39. They are distributed sparingly (five or less) through the months from October to April, inclusive, but are much more numerous (33 to 13) in the months from May to September. The records come from 50 different localities well distributed over a large part of the Navajo Country. R.B.-M.V. expedition observers (Hargrave, Russell, Lyons, Woodbury, Teall) and others (Benson, Wetherill,

Phillips) have more than a hundred records in years 1933-38, ranging between March 23 and October 2, well distributed over the northern part of the Navajo Country. It was so common everywhere that most observers quit recording it.

Discussion: The Common Rock Wren is a very conspicuous bird in its habitat of rocky outcrops and boulder strewn slopes, wherever rocks offer shelter and holes for nesting sites. In the Navajo Country such habitats are common in nearly all parts of the area, and the bird is consequently widespread, not only in area, but also in altitude, varying from 3100 feet on the Colorado River to 10,000 feet on Navajo Mountain. (See Canyon Wren for comparison.) It has been observed in a great many places: San Juan and Colorado river banks, Kaiparowits Plateau region, Monument Valley and Navajo Mountain in Utah; Kayenta, Black Mesa, Marsh Pass, Kletthla Valley, Shonto Canyon, Tuba City, Cameron, the Tsegi canyons, Hopi villages, Defiance and many other places in Arizona. Monson's records seem sufficiently extensive to indicate that the bird winters sparingly in rocky places about canyons and valleys and that it is much more numerous in summer. Monson thinks the spring arrival begins about March 20, and probably continues through April into May. Fall departure occurs in September. The records show parents carrying food to nests on June 25 and July 7, while on the other hand, young out of the nest were recognized on June 24, 28 and 30, July 2, 4, 5, 7, 8, 11, 15 and 20. It seems probable that the young broods emerge in late June or early July. Family flocks have been recognized during July and August, but the birds are probably solitary or in solitary pairs at other times. The two specimens of nests taken are quite similar, both constructed of fine stems, roots, bark or hair, carefully arranged without any special lining but having coarser materials outside and underneath.

WESTERN MOCKINGBIRD . . . *Mimus polyglottos leucopterus*

A summer resident of the thickest bushes of the open flats, often associated in late summer in flocks with Bendire and Sage Thrashers.

Specimens: ♂, May 7, 1903, Adamana on Rio Puerco, Arizona (Cornell Univ). Two ♂♂, May 8, 16, 1892, near Bluff on San Juan River, Utah (AMNH). Adult and immature ♂, June 27, 1938, 6100 feet, greasewood flats, near Marsh Pass, Navajo County, Arizona (UU). Nest and five eggs (second brood), July 9, 1938, 5500 feet, greasewood flats, near Kayenta, Navajo County, Arizona (UU). Juvenile ♀, July 9, 1937, 4500 feet, open pigmy conifers, four miles up Tsegi Canyon from Marsh Pass, Navajo County, Arizona (MNA). Nest only, July 18, 1938, 6000 feet, thorny berry bushes, Kletthla Valley, near Cow Springs, Navajo County, Arizona (UU). Juvenile ♂, July 30, 1936, 6500 feet, sagebrush, five miles south of Navajo Mountain Trading Post, Coconino County, Arizona (UU).

Observations: Coues (1866) lists a record on the Little Colorado River, doubtless 1864, common. Merriam (1890:100) found it common near Grand Falls on Little Colorado River, August 12 and 19, 1889. Rowley (AMNH) encountered it near Bluff on the San Juan River in Utah, May 8 and 16, 1892. Streater saw "a few" at Holbrook between April 19 and May 7, 1893. Fisher (1903:36) observed it at Keams Canyon in late July, 1894. Chapman and Fuertes located it at Adamana May 7, 1903. Records since that time are too numerous to delineate. Monson has 85 records in years 1936-39, between April 17 and August 26. Of these, one is in April, 27 in May, 24 in June, 16 in July and 17 in August. They come from about 30 localities well dis-

tributed. R.B.-M.V. expedition observers (Hargrave, Russell, Woodbury) and others (Benson, Wetherill, Phillips, Jenks, Stevenson) have about 40 records in years 1934-38, ranging from May 8 to October 13. Of these, one occurs in May, 11 in June, 22 in July, five in August and one in October. The birds have been observed in suitable habitats all along the road from Cameron to Kayenta (Moencopie Wash, Pasture Canyon, Red Lake, Cow Springs, Klethla Valley, Marsh Pass, Kayenta) and there are a few records from the Tsegi canyons, from the flats south of Navajo Mountain and from the Colorado River Canyon $3\frac{1}{2}$ miles above Lee's Ferry in Arizona; and from Monument Valley in Utah.

Distribution: A summer breeding resident, at least from May to August, the Western Mockingbird is found throughout the open flats wherever the bushes are thick and tall enough to offer needed security, or among open trees of certain types. They have been seen in greasewood, sagebrush, rabbitbrush and thorny bull berry bushes, so apparently it is the size and arrangement of cover rather than kind that determines the habitat. Perhaps water for drinking may be a factor in their habitat selection. The densest concentrations we found in Klethla and Laguna Creek valleys were within flying reach of water. Monson estimates that the birds begin to arrive in migration about April 15 and depart in late August or early September. Wetherill has a record of October 13, which may be regarded as unusually late. They appear to raise two broods during the summer, the first brood leaving the nest about the first of July. We have several records of single or paired birds observed during June, but the earliest record of young out of nest is July 2. Thereafter, singles, pairs and families have been observed. On July 9 a nest containing five nearly fresh eggs was found, which we interpreted as a second brood. The nest is a bulky affair, about 4 x 7 inches, constructed of rough twigs of irregular dimensions, and lined with roots, leaving a nest cavity about 2 x 3 $\frac{1}{2}$ inches. The eggs are greenish, speckled with brown, more heavily at the large end. The mockingbird habitat is very similar in this region to that of two other mimids, the Bendire and sage thrashers. While there may be divergences in habitats, we did not discover exactly what they are, and we found them together in several places. In these mixed flocks there were usually more mockingbirds and less Bendire than sage thrashers. In Klethla Valley, where we found them thus mixed, they appeared to be feeding upon small green caterpillars of a moth that were so numerous on the Russian thistles as to be in plague proportions and there was really no competition for food.

CATBIRD . . . *Dumetella carolinensis*

Probably a migrant; Monson thinks it may be a breeder in Tunicha Mountains. **Specimens:** ♀, June 25, 1927, Wheatfield Creek, west side of Tunicha Mountains, 7000 feet (Trapier, USBS). **Observations:** August 25, 1909, Lee's Ferry, Arizona, Nelson took a specimen but presumably did not preserve it. Late April, 1934, near Blue Lake Wash, five miles west of Cow Springs (MAW).

BENDIRE THRASHER . . . *Toxostoma bendirei*

A summer breeding resident of low hot open valleys with tall shrubs or bushes.

Specimens: Adult ♂, June 24, 1938, 4000 feet, cottonwood among greasewoods in Moencopi Wash, between Cameron and Tuba City, Arizona (UU). Adult ♂, July 3, 1936, scattered cottonwoods and brush, one mile

south (and below) Tuba City, Coconino County, Arizona (MNA). Skin, July 4, 1927, Monument Valley, Utah (BYU). Juvenile ♂, July 8, 1936, in farms one mile south and below Tuba City, Arizona (MNA). Imm. and Ad. ♀ ♀, July 9, 1938, 5500 feet, greasewood flats, near Kayenta, Navajo County, Arizona (UU). Imm. ♂, July 15, 1894, Holbrook, Arizona (Fisher USBS). Three immatures, July 18, 1938, 5900 feet, matchweed and tall bushes, Klethla Valley near Cow Springs, Navajo County, Arizona (UU). Adult ♂, July 18, 1938, tall bushes, Klethla Valley, Navajo County, Arizona (UU). Immature ♂, July 24, 1938, 5000 feet, squaw bush, Moenave, Coconino County, Arizona (UU). July 31, 1894, Keams Canyon (Fisher, 1903: 35). Immature ♂, August 24, 1932, Shungopovi, Hopi Pueblo (MNA).

Observations: Merriam found two thrashers probably of this species on the Little Colorado Desert probably in the vicinity of Oraibi, August 15, 1889. Fisher (1903:35) found it at Holbrook, July 15, and Keams Canyon, July 31, 1894. In the years 1935-38, inclusive, 19 records are available. Hargrave reported one each from Tonalea, June 8, 1935, and Cow Springs, June 8, 1934. Phillips found several families with young birds on the wing around Tuba City, July 3-9, 1936. Russell found it in Bubbling Springs Canyon, July 7-28, 1935. The bird has been observed at several places along the Cameron-Kayenta road (Moenave Wash, Moenave, Tuba City, Pasture Canyon, Cow Springs, Klethla Valley, Laguna Creek Valley) and in Bubbling Springs Canyon (Tsegi drainage) in Arizona, and in Monument Valley, Utah. Russell thinks it only accidental in the Tsegi Canyons. Woodbury and Russell found it in nearly all the open flats and valleys containing thick brush between Cameron and Kayenta in the summer of 1938 between June 24 and July 24. Several singles were seen first, but after July 9 families and small flocks were more common. Monson has 33 records in years 1937-38, ranging from April 17 to August 25 from about 17 different localities.

Distribution: The Bendire Thrasher is a summer resident of the low hot open valleys where the bushes are tall enough to provide thick cover. The limits of their stay are not determined, but Woodbury (1939:159) reports a singing male at Escalante, Utah, as early as May 9 and Monson has some April records. Our latest record, being July 28, probably does not indicate its fall migration time. It has been observed between 4500 and 6500 feet altitude but probably occurs in suitable habitats in lower altitudes. Its habitat is quite similar to and no doubt overlaps in part the habitat of the mockingbird (which see for comparison). Family flocks containing both adults and immature birds were observed as early as July 7 by Phillips, and July 9 by us in Laguna Creek Valley and July 18 in Klethla Valley. We found no evidence of a second brood, but we did find it in mixed flocks with sage thrashers and mockingbirds.

CRISSAL THRASHER . . . *Toxostoma dorsale dorsale*

(Hypothetical)

J. O. Stevenson reported seeing a wary thrasher that was "dark brown and with a long curved bill" in the pigmy conifers four miles east of Oraibi, 5700 feet, July 29, 1934. This seems to be the species to which it must be referred. The only corroboration available comes from the southwest across the The Little Colorado River, in the direction of San Francisco Mountain where Yeager and Hargrave found it as a fall transient (August-September).

SAGE THRASHER . . . *Oreoscoptes montanus*

A summer breeding resident of the open flats and valleys among the larger brush.

Specimens: Adult ♂, March 23, 1934, 5900 feet, Kayenta, Navajo County, Arizona (MNA). ♀, May 2, 1892, Riverview on San Juan River Utah (AMNH). Specimen, mid-May, 1858, Fort Defiance (Baird, 1861:6). Adult ♀, July 8, 1938, 6700 feet, sagebrush near Little Man's Lake, Navajo County, Arizona (UU). ♀, July 5, 1927, Monument Valley, Arizona (BYU). Adult ♀, ♂, and immature ♀, July 9, 1938, 5500 feet, greasewood flats near Kayenta, Navajo County, Arizona (UU). Adult ♀, July 14, 1933, Kayenta, Arizona, several large eggs in ovary (MNA). Adult ♀, July 14, 1933, Kayenta, Arizona, one large egg in ovary (MNA). Adult ♂, July 14, 1933, Kayenta, Arizona (MNA). Juvenile ♂, August 18, 1936, 4500 feet, two miles NE of Totem Pole, Monument Valley, Navajo County, Arizona (UU). ♂, August 26, 1909, Lee's Ferry, north side of Colorado River (Nelson, USBS).

Observations: Mollhausen (Baird 1861:6) found it around Fort Defiance in mid-May, 1858. Merriam (1890:100) encountered six on the Little Colorado Desert, August 12-19, 1889. Rowley (AMNH) saw it at Riverview on San Juan River, Utah, May 2, 1892. Nelson found a family in the sagebrush August 7-8, 1909, and again encountered it August 10 near Walpi and August 26 at Lee's Ferry. Hargrave, Russell and Woodbury have 11 records between March 23 and August 22 in years 1934-38. These records come from the Tuba City vicinity, Red Lake (Tonalea), Kletthla Valley, and Laguna Creek near Kayenta, in Arizona, and from Monument Valley in Utah, but it probably occurs in similar habitats in other localities. Monson has 61 records in years 1936-38 extending from February 8 to October 17 from about 35 localities. These are distributed: 1 in February, 4 in March, 6 in April, 17 in May, 1 in June, 6 in July, 4 in August, 13 in September and 9 in October. He thinks they are rare or absent in winter, much less in evidence during the breeding season and more common in May and September.

Distribution: The Sage Thrasher is distributed through the open flats from 4500 to 6500 feet altitude, particularly where the brush is large enough to provide suitable cover. It has been found in family flocks containing both adults and juveniles on July 9 and 18, so presumably the broods emerge from nests about the first of July. Some females taken July 14 contained large eggs, suggesting the idea of a second brood.

WESTERN ROBIN . . . *Turdus migratorius propinquus*

A permanent resident, breeding principally in the oaks and ponderosa pines (7000-9000 feet), but overflowing into both higher and lower habitats.

Specimens: Adult ♀, January 9, 1938, Betatakin Canyon, Navajo County, Arizona (MNA). ♂, June 21, 1927, Lukachukai Mountains, Apache County, Arizona (Trapier, USBS). Adult ♂, July 21, 1936, 8500 feet, ponderosa pines, near War God Spring, Navajo Mountain, San Juan County, Utah (UU). ♂ and Juvenile, August 11, 1937, 7000 feet, ponderosa pines, Kaiparowits Plateau, Kane County, Utah (UU). Juvenile ♂, August 16, 1936, 9000 feet, ponderosa pine, southwest side of Navajo Mountain, San Juan County, Utah (GC). Immature ♀ skeleton, September 19, 1937, Betatakin Canyon, 7000 feet, Tsegi Canyon, Navajo County, Arizona (MNA).

Observations: Merriam (1890:101) noted a few individuals at Grand Falls on the Little Colorado River, August 12 and 19, 1889. Trapier found it in the Lukachukai Mountains in late June, 1927. Benson observed it singing daily in the ponderosa pine belt near War God and Soldier Spring on Navajo Mountain, June 12-20, 1933. Jenks saw several at Chi Dodge, 20

miles north of Fort Defiance, June 24, 1933. Wetherill noted it at Betatakin Canyon several times a month during the months March to June and August to October, inclusive, in years 1934-36. Monson has 31 records in years 1936-39 from many places ranging from Tuba City east toward New Mexico, and occurring in 9 out of the 12 months. Many of them are winter records from low altitudes (mainly 5000-7000 feet). A few from low altitudes occur during the breeding season (Keams Canyon, May 7, 8, 9, July 12, Fort Defiance, June 9, 23), probably associated with deciduous trees. He states that the robin is common in the Lukachukai Mountains during migration and breeding season; breeds sparingly on Bahlakai Mesa and Defiance Plateau, where it is common in migration; and is rare in winter. R.B.-M.V. expeditions (Hargrave, Russell, Teall) have 18 records from the Tsegi canyons during the summer, June to August, and several from the pine forests of Navajo Mountain. In the canyons, the records come mostly from deciduous trees and brush among the pigmy conifers. Woodbury has records from the Kaiparowits Plateau.

Comments: The Robin is a regular breeder of the oaks and ponderosa pine forests and possibly of the spruce-fir forests of the mountains, usually about 7000 feet. It may be a sparse breeder in deciduous thickets among pigmy conifers and deciduous trees along streamside at somewhat lower altitudes. It is possibly limited to areas within reach of water where it can obtain mud for its nest. Its chief breeding areas appear to be Navajo Mountain and Kaiparowits Plateau, Utah, and Lukachukai Mountains, Defiance Plateau and favorable points in canyon heads on Black and Bahlakai Mesas, possibly elsewhere, in Arizona. It is probably common in migration in these same areas and more sparsely distributed both in migration and winter in lower altitudes. Hargrave reports a nest with three downy young in the oaks on June 20, and Russell reports finding a broken egg in the spruce-fir forest of Navajo Mountain between July 11 and 18. Young ones, presumably freshly out of the nest, are recorded on June 15, July 13, 18, probably indicating two broods.

AUDUBON HERMIT THRUSH . . . *Hylocichla guttata auduboni*

A summer resident in the spruce-fir forest cap on the top of Navajo Mountain, 9000-10,000 feet: in the heads of certain canyons containing fir forest; possibly in the Lukachukai and other mountains.

Specimens: Adult ♂, July 14, 1936, 10,000 feet, spruce-fir forest, top of Navajo Mountain, San Juan County, Utah (UU).

Observations: May 30, 1937, Betatakin Canyon, two pairs (LH). June 16, 1933, Betatakin Canyon: seem to be common, song was frequently heard. Did not see them—thickets almost impenetrable (LH). June 18, 1933, Navajo Mountain, Utah; two males were collected at 10,000 feet on Navajo Mountain. Thrushes were seen and heard singing only in the dense spruce-fir forest where their singing posts were the tops of dead trees (Benson). July 6, 11-18, 1936, common (estimated 100 pairs) in spruce-fir forest on the top of Navajo Mountain (HNR). July 16, 1936, a nest with one well-grown juvenile found, top of Navajo Mountain (HNR). August 13, 1936, entirely absent from the spruce-fir forest on the top of Navajo Mountain (HNR). September 19, 1936, Betatakin Pueblo; recorded (MAW). October 6, 1936, Defiance Plateau, one observed (GM).

Distribution: Found chiefly on the top of Navajo Mountain where they breed (9000 to 10,000 feet), but they are also recorded from Betatakin in June and September, where they may also nest. Russell estimated 100 pairs

in the spruce-fir forest on top of the mountain between July 6 and 18, 1936, but did not find any on August 13. They had probably stopped singing and were missed. A nest containing a well-grown nestling was found on July 16, which gives a hint that the young birds emerge from the nests in July. Observations elsewhere may not belong to this race. They may occur in other mountains.

OLIVE-BACKED THRUSH . . . *Hylocichla ustulata almae*
(Hypothetical)

Observations: May 6, 1937, one seen at Talahogan Gardens near Keams Canyon. Rare (Monson).

WILLOW THRUSH . . . *Hylocichla fuscescens salicicola*
(Hypothetical)

Observations: September 20, 1916, "seen near an irrigated field at Ganado" (Skinner). Only a sight record; may not be correctly identified.

CHESTNUT-BACKED BLUEBIRD . . . *Sialia mexicana bairdi*

A permanent resident; a common breeder and sparse winter resident, mostly 6000-9000 feet.

Specimens: Adult ♂, June 23, 1934, 6700 feet, Dogoszhi Biko, Navajo County, Arizona (MNA). ♂, June 26, 1927, Whiskey Creek, Tunicha Mountains (Cantwell, USBS). Adult ♂, July 4, 1936, 8000 feet, ponderosa pine forest, Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Immature ♀, July 4, 1938, 6300 feet, edge of pigmy forest, near Marsh Pass, Navajo County, Arizona (UU). Immature ♀, July 7, 1938, 5500 feet, pigmy forest fringe, near Kayenta, Navajo County, Arizona (UU). Nest and three eggs, July 12, 1938, birdhouse in cottonwood, Shonto Trading Post, Navajo County, Arizona (UU). Adult ♂, July 13, 1935, 7200 feet, pigmy forest, mesa spring above Bubbling Springs Canyon, Tsegi drainage, Navajo County (GC). Immature ♀, July 23, 1936, valley flat—salt brush, three miles up main Tsegi Canyon, Navajo County, Arizona (MNA). Adult ♀, August 5, 1934, pigmy conifers, Dogoszhi Biko, Navajo County, Arizona (MNA). Adult ♂, August 16, 1935, 9000 feet, ponderosa pine forest, southwest side of Navajo Mountain, San Juan County, Utah, moulting, bob-tailed (GC).

Observations: Cantwell (USBS) found it in the Tunicha Mountains in late June, 1927. Benson (1935:445) saw many daily in the pine forest on Navajo Mountain. June 13-16, 1933. Jenks saw "several" in the pines on the road between Querino Canyon and St. Michaels, June 20, 1933. Monson has 40 records in years 1936-39 distributed through every month in the year. Many of these are from the valleys, especially during migration and winter. During the fall they are aggregated in flocks containing up to 250 birds, probably in migration. During the balance of the year the records indicate smaller groups, sometimes singly or in pairs, especially during the early breeding period. The R.B.-M.V. expeditions (Hargrave, Russell, Teall, Woodbury) have 30 summer records between mid-June and mid-August in years 1934-38. A pair each day was noted in the spruce-fir forest on top of Navajo Mountain July 14-16, and from 1-6 birds in the pine forest on the same mountain on four days between July 6 and 23, 1936. The balance of the records come mainly from many places in the pigmy conifers, especially from the forest edges or openings in the trees.

Comment: A common resident of the ponderosa pines and pigmy conifers. Its usual habitat lies between 6000 and 9000 feet. It has been found in so

many places well distributed over the Navajo Country that it may be considered a summer resident throughout the pigmy conifers of the foothills and mesas and upward into the mountains in the ponderosa pine belt and even into the spruce-fir forest. It also spreads downward into streamside cottonwoods where it has also been observed to breed (Monson). It is much more in evidence in August when the young broods are out of the nest and still more in evidence in September and October when in migration. It thins out greatly about November but a few appear to remain for winter. Families containing young birds out of the nest are recorded on June 4, 18, 24, and July 23, but from July 15 on they are mostly recorded as small flocks, 10-20, generally implying more than one family per flock, but usually containing both young and adult birds. Being hole-nesting birds, they seem more or less limited in breeding to places where they can find suitable hollow trees or substitutes.

MOUNTAIN BLUEBIRD . . . *Sialia currucoides*

A permanent resident, breeding mainly in the open portions of the pigmy conifers.

Specimens: ♂, April 20, 1892, Noland's Ranch, near 4-corners on San Juan River, Utah (AMNH). Specimen, mid-May, 1858, Fort Defiance (Baird 1861:5). Immature ♂, June 22, 1934, 6700 feet, Water Lily Canyon, Navajo County, Arizona (MNA). Two ♀, June 26, 1927, 6500 feet, Whiskey Creek, Tunicha Mountains, Arizona (Cantwell, USBS). Immature, July 4, 1938, 6500 feet, pigmy forest near Marsh Pass, Navajo County, Arizona (UU). Adult ♂, July 5, 1935, 6600 feet, oak brush in Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC). Immature ♂, July 19, 1894, Keams Canyon, Arizona (Fisher, USBS).

Observations: Mollhausen first saw the Mountain Bluebird around Fort Defiance in mid-May, 1858. Rowley found it at Noland's Ranch on San Juan River, Utah, near 4-corners, soon after Mid-April, 1892. Fisher (1903:36) found it at Keams Canyon in late July, 1894. Cantwell encountered it in the Tunicha Mountains in late June, 1927. Jenks ran across it in meadows in the pine belt between Querino Canyon and St. Michaels, June 20, 1933, at St. Michaels the next day and at a little natural bridge five miles southwest of Fort Defiance another day later. Wetherill has records from Betatakin, Kiet Siel and Tsegi canyons extending from April to October, usually several records per month over the years 1934-36. R.B.-M.V. expeditions (Hargrave, Russell, Woodbury) have over 30 records mostly between mid-June and mid-August in years 1934-38. These records all come from the pigmy conifers, especially the edges or openings or from nearby valleys. Monson has records of 182 observations in years 1936-39, well distributed through every month, and from many localities well distributed through the Navajo Country. His records leave no doubt that it is a permanent resident but they also indicate seasonal fluctuations in population. The average numbers encountered in one place run from 2 to 5 during April, May and June, but run from 7 to 15 during the balance of the year. Total number encountered per month range from a minimum of 28 in May to 372 in August.

Comment: The Mountain Bluebird is common over most of the entire Navajo Country throughout the year. It breeds mainly in the edges and openings or among scattering trees of the pigmy conifers, but spreads somewhat into the valleys and open lands at other times of the year. It occupies much the same habitat as the Chestnut-backed Bluebird, but there is probably a slight ecological difference in that the latter may take more to the forest and

the former to the edges and openings. Although known elsewhere (farther north in Utah and farther south in Arizona) to ascend mountains through the pine belt, our expeditions did not find it on Navajo Mountain and Monson remarked that it was apparently rare in Lukachukai Mountains. Our records indicate its altitudinal range as approximately 6000-7500 feet. Monson thinks it nearly confined to the pigmy conifers during the breeding season. He found a nest containing two eggs in a hole in a fence post on May 21, 1937. They hatched two days later. Nesting birds with young in nest have been noted June 14, 17 and 25; young birds out of nest on June 24, and small family flocks on July 4, 12 and 16. After the middle of July larger flocks containing more than one family are not uncommon. Sometimes the mountain bluebirds may be mixed with the chestnut-backs. The juvenals of the two species are very similar but can usually be distinguished by the darker wings, tail and underparts of the latter.

TOWNSEND SOLITAIRE . . . *Myadestes townsendi*

A sparse breeder of the Tsegi canyons, Lukachukai Mountains and possibly in other mountain areas; and a sparse winter resident of the lowlands.

Specimens: Adult ♂, ♀, June 26, 1934, 6850 feet, oaks in Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♀, July 20, 1935, 7000 feet, willows and Douglas firs, at Ladder House in Long Canyon, Navajo County, Arizona (GC). Juvenile ♀, July 28, 1935, 6700 feet, oaks in Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC).

Observations: Hargrave took a pair in Water Lily Canyon, Tsegi drainage, the female of which had a featherless brood patch, June 26, 1934. Russell noted a bird each day in the oaks in Bubbling Springs Canyon, Tsegi drainage, June 30, July 4 and 28, 1935. He reported in 1935 that the rocky ledges that this odd thrush likes for nesting sites are abundant, and it seems to make good use of them. "Last year one was observed feeding a juvenile bird and this year one of these juveniles was secured, as well as an adult." These, with the birds in breeding condition taken last season, establish the breeding record beyond question. The birds are not common but seem well distributed. They were more frequently seen in the oaks than anywhere else and seemed to prefer the shade. None were found on Navajo Mountains. Monson has 26 records of observations mostly of single birds from lowland areas in years 1936-39 in months from October to April. He has one record in June from Roof Butte in Lukachukai Mountains. His records indicate that it arrives about October 1 and departs from the lowlands about April 20; that it is sparingly distributed over the wooded portions during winter but is slightly more common in the fall migration.

WESTERN GNATCATCHER . . . *Polioptila caerulea amoenissima*

A summer resident, from mid-April to early September, occupying the pigmy conifers, oaks, sagebrush and bushes of various kinds.

Specimens: ♀, June 5, 1927, pigmy conifers about 30 miles north of Oraibi, 6500 feet (Cantwell, USBS), ♂, June 14, 1933, 6500 feet, Tsegi Canyon (MVZ). Adult ♂, June 16, 1934, 6800 feet, pigmy conifers, Marsh Pass, Navajo County, Arizona (MNA). Nestling ♀, July 3, 1938, 6200 feet, pigmy forest, Marsh Pass Camp, Navajo County, Arizona (UU). Juvenile, July 4, 1937, 4500 feet, willows in Monument Valley, near Utah-Arizona line (UU). Adult ♀, July 5, 1938, 6500 feet, pigmy forest, near Marsh Pass, Navajo County, Arizona (UU). ♂, July 6, 1937, 4500 feet, bushes.

Monument Valley, Arizona (UU). Adult ♂, July 14, 1933, Kayenta, Arizona (MNA). Adult ♂, July 18, 1934, 7300 feet, pigmy conifers, Water Lily Canyon, Navajo County, Arizona (MNA). Adult, July 24, 1935, 6700 feet, pigmy forest, Long Canyon near its mouth, Tsegi drainage, Navajo County, Arizona (UU). Adult ♂, July 25, 1936, from sagebrush, in pigmy forest near Navajo Mountain Trading Post, Coconino County, Arizona (UU). Juvenile, July 26, 1937, 3300 feet, oaks, Colorado River near Rock Creek, Utah (UU). Juvenile ♂♂, July 30, 31, 1937, 7000 feet, service berry, Kaiparowits Plateau, Utah (UU). Adult, August 10, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau, Utah (UU).

Observations: Phillips has concluded that the records of *P. melanura* (= *plumbea*) cited from the Little Colorado Valley by Coeus (1866:66) and from Keams Canyon by Fisher (1903:36) July 30 and August 2, 1894, really belong here. Merriam (1890:101) reported two birds in the greasewood in Moencopie Wash in late September, 1889. Benson found it in the pigmy conifers south of Navajo Mountain in Utah and Arizona in late June, 1933. Wetherill found it to be a common resident in Betatakin Canyon where he observed it almost daily from mid-April to late August in years 1935-36. R.B.-M.V. expedition observers (Hargrave, Lyons, Teall, Russell, Woodbury) have 50 records from mid-June to mid-August, 1934-38. These come mainly from the Tsegi canyons, Marsh Pass and Black Mesa slopes, Arizona, but there are a few from the canyons and mesas around the foot of Navajo Mountain in Utah. They come mostly from the pigmy conifers, but have also been reported from a variety of other habitats: willows and bushes in Monument Valley, thickets on Colorado River, service berries on Kaiparowits Plateau, oaks, greasewoods and sagebrush in the Tsegi canyons. Monson has 37 recorded observations, one each in April and September, but the balance are well distributed through May, June, July and August, 1937-38.

Discussion: This active scolding tiny bird is a common summer resident of most of the pigmy conifers, although it is by no means restricted to that forest. It has been found in the oak thickets, in sagebrush, in bushes, in greasewood and even in willow thickets. It seems that the type of cover (thick foliage) is more important than any particular kind of plant. Russell noted, however, that it tended to pick the junipers in preference to the pinons for nesting trees. Most of the recorded localities lie between 6000 and 7500 feet altitude, but some are lower (5500, 4500 and 3300 feet). Possibly some are higher, but probably not over 8000 feet. The bird probably remains here from mid-April to late August or early September, inclusive, coming early and leaving early. The earliest record we have of nesting is June 22, when an incubating bird was found. Many observations of birds in pairs were recorded in June and early July. We have several records of families with young out of the nest all through July and early August. Wetherill records them in mixed flocks with titmice and chickadees on August 20, but remarks that they had all left Betatakin by August 31. On July 3, 1938, a nest (UU) containing five young ones nearly feathered was located in the Marsh Pass Camp about four feet up on a horizontal limb of a juniper tree and watched carefully for an hour from 1:39 to 2:39 p.m. Both parents together bringing food to the young fed them 30 times, an average of one food-bringing trip per parent every four minutes. When a parent arrived with food, which appeared to consist exclusively of insects, five open mouths uttering hunger cries were presented by the nestlings. The parent bill was inserted in one open mouth and then withdrawn, leaving the insect in the youngster's mouth. Hunger cries of those not fed did not immediately subside, sometimes lasting after the parent had left the nest. When approaching the nest, both parents almost invariably flew to an approach tree

about 25 feet distant and flitted back and forth several times before flying to the nest. In most cases the parents arrived separately but on a few occasions they both arrived together and fed two youngsters simultaneously. Only three times out of 30 did a parent deviate from the regular incoming route. When leaving the nest, however, there seemed to be no regular route. They flew in various directions, usually going directly to neighboring juniper trees where they perched and watched for food. The closer trees were thus visited oftener than those farther away, although they occasionally went as far as 100 yards. The nest (UU) was made of shredded juniper bark and miscellaneous fibers, coated with juniper bark pieces held in position by fibers resembling spider webs, and lined with feathers. The size: outside, 3 inches diameter, 2 inches deep; inside, $1\frac{1}{2} \times 1\frac{1}{8}$ inches. At 6 p.m. the nest was visited again for closer inspection, and one of the young ones was touched, whereupon it jumped out of the nest creating a decided disturbance, which soon attracted the parents who joined in the general commotion. During the resultant confusion, the other youngsters one by one left the nest and flew to different trees so that the whole family was effectively scattered. During the next day or two the youngsters perched in different places in trees, still being tended by the parents.

GOLDEN CROWNED KINGLET . . . *Regulus satrapa apache*
(Hypothetical)

Probably a migrant, included upon the basis of spring and fall observations by Wetherill at Betatakin Canyon. Monson thinks it may breed in the Lukachukai Mountains. It was not found in the spruce-fir forest in summer on the top of Navajo Mountain, but our observations are not sufficient to prove that it was not there. It is a bird that is easily overlooked.

Observations: March 10, 1935, Betatakin Canyon, "I made sure of it as I was able to see one within six feet of me. It was a male" (MAW). October 20-30, 1934, Betatakin Canyon: one pair in mixed flock of chickadees and bush-tits observed at five feet distance. Were not more than eight feet above ground in Gambel oaks—a pair seen daily until the 30th of October (MAW).

WESTERN RUBY-CROWNED KINGLET . . . *Regulus calendula cineraceus*

A spring and fall migrant through the area and a breeder in the spruce-fir forest on the top of Navajo Mountain. According to the A.O.U. Check List, the eastern race is the breeder to be expected in Arizona, but our specimens, while equal in size to the eastern birds, are definitely grayer and less green than the eastern specimens examined and hence are placed with the western race.

Specimens: Adult ♂, March 24, 1934, pigmy conifers, Marsh Pass, Navajo County, Arizona, 6000 feet (MNA). ♂, April 20, 1892, Noland's Ranch, near 4-corners on San Juan River, Utah (AMNH). Two skins, April 29, 1935, near Bluff, Utah (UU). Juvenile ♀, July 15, 1936, 10,000 feet, spruce-fir forest, top of Navajo Mountain, San Juan County, Utah (one of four juveniles attended by two adults) (UU). Adult ♀, August 14, 1935, 9000 feet, ponderosa pine forest, SW side of Navajo Mountain, San Juan County, Utah (UU). Adult, October 29, 1935, Betatakin, taken from a small owl (MAW).

Observations: Hargrave and Wetherill have six records from Marsh Pass, Tsegi and Betatakin canyons, between March 24 and May 2; and 11 records between September 16 and October 29, 1934-36. Russell has several

records from the spruce-fir forest on the top of Navajo Mountain in July and August, 1935-36. These include a singing male, July 6; at least 20 birds June 13-18 averaging about two pairs daily; 3 or 4 birds August 13, 1936, and one August 14, 1935. Monson has 22 records, of which 6 were in April, 3 in May, 1 in June, 2 in September, and 9 in October, evidently indicating greater frequency during spring and fall migrations. The record on June 24, 1938, from Roof Butte may indicate breeding in the Lukachukai Mountains. The other records come from widely scattered localities from Navajo Canyon to Defiance Plateau. The one December record comes from Tuba City area.

Discussion: This kinglet is a breeder, certainly on the top of Navajo Mountain and probably in the tops of the Lukachukai Mountains. It is a migrant through the wooded areas and seems to be well distributed over the country. The only available evidence of wintering comes from the Tuba and Moenave region. An interesting incident reported by Wetherill was the taking of a Ruby-crowned Kinglet away from a small owl which had killed it about 2:30 p.m. in a Douglas fir at Betatakin, October 29, 1935.

AMERICAN PIPIT . . . *Anthus spinoletta rubescens*

Migrant and winter resident. **Specimens:** Adult ♂, March 23, 1934, 5900 feet, reservoir near Kayenta, Navajo County, Arizona (MNA).

Observations: Merriam saw (1890:99) several at Moa Ave (Moenave) September 21, 1889. Skinner (USBS) saw several small flocks (total 24) near St. Michaels, September 28-29, 1916. Monson has eight records from Tuba City and two from nearby Moenave in January, March and December, 1936-39. Also a record from Joseph City on the Little Colorado, February 7, 1938; one from Antelope Tank NW of Kaibito, April 14, 1937, and one from Snake Butte SW of Polacca, October 13, 1938.

Comments: This bird seems to migrate through the area possibly in April and September and winters in the open lowlands. It seems probable that the race *A. s. alticola* might winter in the country but there are no available specimens to prove it.

CEDAR WAXWING . . . *Bombycilla cedrorum*

Monson (1939:168) reports two birds feeding on apple blossoms at Keams Canyon, Arizona, May 8, 9, 11, 12, 1937, and single individuals on May 23 and June 7.

PHAINOPEPLA . . . *Phainopepla nitens lepida*

May be a sparse breeder in the cottonwoods.

Observations: July 2, 1936, ♂ and two ♀♀ seen in cottonwoods and poplars in Tuba City, Coconino County, Arizona (ARP). June 24, 1937, ♂ observed at Keams Canyon (Monson 1939:168).

NORTHWESTERN SHRIKE . . . *Lanius excubitor invictus*

Only one record. One was caught in a guest lodge at the Wetherill Ranch at Kayenta, December 23, 1935 (MAW).

NEVADA SHRIKE . . . *Lanius ludovicianus nevadensis*

A permanent resident of the Navajo Country, occupying the open flats, valleys or canyon bottoms from 3000 to 7000 feet.

Specimens: Adult ♂, January 25, 1934, 5800 feet, Kayenta, Navajo County, Arizona (MNA). Adult ♂, April 29, 1935, near Bluff, Utah (UU). Two specimens, June 26, 1927, Tunitcha Mountains, Apache County, Arizona (Anderson (1934:81)). Immature, June 29, 1938, 6700 feet, greasewood flat, Tsegi Canyon near Marsh Pass, Navajo County, Arizona (UU). Adult ♀, July 8, 1938, 6700 feet, juniper and sagebrush, near Little Man's Lake, Navajo County, Arizona; with nest and two eggs, also two enlarged eggs nearly ready for laying (UU). ♀, July 12, 1937, 4500 feet, desert bushes, Monument Valley, Arizona (UU). Adult ♀, July 22, 1938, 5300 feet, dead apple tree, Pasture Canyon, Tuba City, Coconino County, Arizona (UU). July 26, 1937, 4000 feet, cottonwoods, Rock Creek, Kane County, Utah (UU). Adult ♂, July 31, 1936, 6500 feet, sagebrush, seven miles south of Navajo Mountain Trading Post, Coconino County, Arizona (UU). Adult ♀, August 1, 1938, 3400 feet, willows and redbuds, bar 18 miles up San Juan River, San Juan County, Utah (UU). Immature skeleton, August 12, 1937, 10 miles NE of Cow Springs, Navajo County, Arizona (MNA). August 12, 1937, 7000 feet, serviceberry, Kaiparowits Plateau, Utah (UU). Adult, August 15, 1936, 4500 feet, desert brush, East Gypsum Drainage three miles above Totem Pole, Monument Valley, Navajo County, Arizona (UU).

Observations: Merriam (1890:98) reported it to be common on the greasewood plains of the Little Colorado desert, August 12-19, 1889. Fisher (1903:36) observed it at Keams Canyon in late July, 1894. Trapier and Cantwell (USBS) found it in the Tunitcha Mountains, June 26, 1927. Benson (1935:443) saw one on a sagebrush flat five miles south of Navajo Mountain, June 27, 1933. Hargrave noted it "every few miles" on U. S. Highway 66 between New Mexico line and San Francisco Mountains on March 18, 1931. Stevenson saw three in pigmy conifers at Chimopovi 10 miles southeast of Oraibi, 5900 feet, July 29, 1934. A University of Utah expedition found it near Bluff, Utah, in late April, 1935. Wetherill has several records mainly around Kayenta in April, August, September and October. Phillips saw several on Moencopie Wash below Tuba City, July 2-8, 1936, and several along the road by Cow Springs, August 13. The R.B.-M.V. expeditions (Hargrave, Russell, Woodbury) have 42 records in years 1934-38 between June 8 and August 22; also one in January and two in March. They come from localities well distributed over the northern part of the country: Kaiparowits Plateau, San Juan and Colorado river banks, Monument Valley, Oljato and foot of Navajo Mountain, all in Utah; and from Kayenta, Tsegi Canyon, Kletthla Valley, Pasture Canyon and Tuba City, all in Arizona. Monson has nearly 250 records in 1936-39, well distributed through every month in the year but reaching a peak of 55 records in August (about 22 percent in one month). These come from more than 60 localities well distributed in many parts of the country from Cedar Ridge (northwest) to Allantown (southeast) and Tees-nos-pas (northeast), but chiefly from non-wooded mesas, foothills and valleys.

Discussion: The Nevada Shrike remains the year round in the Navajo Country although it may be more plentiful in late summer after emergence of the young broods. It is found chiefly in open situations, not forested, but usually containing scattering tall bushes or trees, the tops of which may be used for perching to watch for prey. Its favorite perch is a topmost dead twig or branch without leaves from which it can survey the ground in all directions. It is not a secretive bird, but boldly perches in a conspicuous place. It has been found at many altitudes from the San Juan and Colorado rivers of 3200 feet to the Kaiparowits Plateau at 7000 feet (Utah). Most of more than 300 records from open valleys, such as those running from Monument Valley

in Utah and Arizona through Kayenta, Marsh Pass, Klethla Valley, Cow Springs, Red Lake, Tuba City to Cameron, Arizona, but there are also some smaller areas of open country in foothills and mesas. It occupies much the same territory as the mockingbird, Bendire Thrasher and the Sage Thrasher, but the niche is considerably different. Whereas those birds are secretive and hunt dense vegetation for cover, this bird prefers more open types of vegetation for itself but may get into the denser vegetation to hunt. It has been found in sagebrush flats, greasewoods, matchweed and shadscale, yucca and ephedra types of cover but apparently not in forests except in the edge as they adjoin other types.

Breeding Notes: There are evidently two broods, one coming off in late June, the other in late summer. We have records of families containing adult and young birds on June 27, 29 and 30, and on July 2, but thereafter the records are mostly of one or two birds in a place. Apparently the parents soon desert the first brood. Monson found two nests in cottonwood trees containing 7 and 6 young, respectively, one brood just hatched May 18, 1937, the other about a week old May 14, 1937. We have a record of a nest with two eggs taken on July 18, evidently a second brood. The female from the nest taken for a specimen contained two large eggs, one in the ovary, the other in the oviduct about to be laid. The nest was a bulky affair about eight inches in diameter set in a bush about three feet up from the ground. The outside and base were constructed of small twigs and sticks less than $\frac{1}{8}$ inch in diameter, and evidently broken from bushes. The main walls of the nest were made of smaller twigs and small green plants 3 to 4 inches tall pulled up by the roots and intertwined with wool. The lining was a mixture of horsehair, string and wool, leaving an inner opening $3\frac{3}{4}$ inches in diameter and nearly two inches deep. We had opportunity to observe a family containing three young just out of nest on July 2, 1938. A parent brought in a *Cnemidophorus* lizard to the three youngsters standing around on the ground by a lone dead greasewood. There was intense chattering and much wing quivering in the begging posture as the parent approached. One of the youngsters got the lizard and placed it on the end of a sharp broken branch puncturing the shoulder girdle. The other two youngsters sat close by but apparently respected the property of the lucky one and made no attempt to take it. The possessor proceeded leisurely to eat the tail bit by bit, next the head and then a hind leg. By this time we were so close as to frighten the birds and the rest of the lizard was abandoned.

GRAY VIREO . . . *Vireo vicinior*

(Hypothetical)

Sparse breeder in pigmy conifers. **Observations:** Fisher (1903:36) reported observing this bird at Keams Canyon during his stay there July 17-August 3, 1894.

Comment: Despite the lack of specimens from our area, there is a probability that it occurs. Evidence from Grand Canyon and southwestern Utah points to its presence in the Navajo Country. It probably occupies sparingly the lower portions of the pigmy conifers and is replaced in the higher portions by the Plumbeous Vireo.

PLUMBEOUS VIREO . . . *Vireo solitarius plumbeus*

A summer resident of the ponderosa pines, oaks and pigmy forest of the mesa tops and slopes.

Specimens: ♂, June 17, 1933, 6500 feet, Tsegi Canyon, Arizona (MVZ). ♂, June 23, 1927, 7000 feet, Wheatfield Creek, Tunicha Mountains (Trapier, USBS). Adult ♂, June 29, 1938, 6800 feet, boxelder and pigmy forest, Marsh Pass, Navajo County, Arizona (UU). ♂, July 1, 1933, 8000 feet, Skeleton Mesa (Long Canyon) (MVZ). Adult ♂ and ♀, July 11, 1938, 7200 feet, oak in pigmy forest and ponderosa pine, Black Mesa near Coal Mine, Navajo County, Arizona: 2 nestlings, nest and egg (UU). Adult ♂, July 26, 1935, 6900 feet, oaks at cliff dwelling in Kiet Siel Canyon, Tsegi drainage, Navajo County, Arizona (GC). Immature ♀, July 12, 1935, pigmy conifers on mesa, 7200 feet, west of Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (UU). Adult, July 29, 1938, pigmy conifers at Marsh Pass, Navajo County, Arizona (UU).

Observations: Jenks (Mss.) reported it in the pines between Querino Canyon and St. Michaels, June 20, and in pigmy conifers five miles southwest of Fort Defiance, June 22, 1933. Wetherill saw it in Betatakin Canyon "through the biggest part of the summer" and recorded it as late as October 22 and 23, 1936. R.B.-M.V. expeditions (Hargrave, Russell, Teall, Woodbury) have more than 20 records of the bird, mainly in Tsegi canyons, around Marsh Pass and on Black Mesa, but a few scattered records come from elsewhere. These range from June 26 to August 7 in years 1933 to 1938. Monson in 1937 reported one bird at Taylors Spring near Keams Canyon, May 10; one on Bahlakai Mesa, June 15; a pair with two young just out of the nest six feet up in pinyon sapling, June 29; one at Steamboat, June 30; one in Hopi Buttes, July 31, and one at Keams Canyon, August 28.

Distribution: This inconspicuous dull-colored Vireo is a bird of moderate numbers in the higher portions of the pigmy conifers but may have been overlooked by many observers. The 40 observations recorded fall in the period from May 10 to October 23, but these dates may not mark the limits of its stay. Apparently all of the records come from the pigmy conifers or from cottonwoods, boxelders, oaks or ponderosa pines sandwiched in among the junipers and pinyons. We have no records from the high altitudes of Navajo Mountain nor from the low altitudes of the San Juan and Colorado rivers. It is mostly found between 6000 and 7500 feet, and always from a forested area. It is a bird of the trees. Most of the records come from the Tsegi canyons, Marsh Pass and Black Mesa, but scattering records come from Navajo Mountain Trading Post, Sand Valley and Skeleton Mesa.

Breeding Notes: Breeding activity is presumably carried on during June and July. Singing birds, parents feeding young on June 26, and a nest with half-grown young found July 11 are all indications. In August the mixed flocks of chickadees, titmice, bushtits and others often contain one or two of the inconspicuous Plumbeous Vireos. The nest found July 11, 1938, was constructed principally of "Kleenex" tissue paper, oak catkins and juniper bark, lined sparingly with fine grasses. The inside cup was about $1\frac{3}{4}$ inches deep and about the same in diameter, and suspended from a horizontal limb about four feet up in a scrub oak about six feet tall, located in the head of a canyon on Black Mesa, in which a few oaks and yellow pines were interspersed among the junipers and pinyons. The nest was found about 1:35 p. m. The adult male was singing in a ponderosa pine about 100 feet away. A female with a brood patch presumably belonging to this nest had been taken nearby, earlier in the day, and the male was tending the nest alone. When the nest was discovered, the young birds were vigorously calling for food. While the observer was still about 20 yards away, the singing male flew to a pinyon about 30 feet above the nest and scolded vigorously and repeatedly until the young sub-

sided and were silent. Presumably a lone parent was not bringing in food fast enough. The nest contained two nestlings with flight feathers sprouting and an infertile white egg spotted with brown at the larger end. While photographing the nest, the male parent came down within six feet and scolded vigorously from the limbs of a pinyon and a neighboring oak. After we left the nest, the male parent resumed his feeding of the young. In the next hour he fed the young six times and twice carried away fecal sacs. Twice he visited the nest oak without feeding.

CASSIN VIREO . . . *Vireo solitarius cassinii*

A migrant, chiefly in August so far as our records indicate.

Specimens: Immature ♀, August 7, 1934, 6800 feet, oaks in Water Lily Canyon, Navajo County, Arizona (MNA). Juvenile, August 11, 1936, 7000 feet, pigmy conifers, east rim of Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♂, August 17, 1935, 9500 feet, aspens near Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). ♀, August 25, 1909, Lee's Ferry, Arizona (Nelson, USBS).

Observations: August 2, 1936, Beaver Creek Canyon: one in oaks and willows (HNR). August 21, 1938, 5300 feet, one near Tuba City reservoir (AMW). September 14, 1938, one at the Cove, Arizona (GM).

Distribution: The Cassin Vireo is only a migrant in Arizona but is a regularly recorded bird from the first of August onward to at least mid-September. In the canyons it seeks an environment quite different from that occupied by the plumbeous vireo, namely, the oaks and other deciduous trees. It was also encountered in the aspens near Soldier Seep on Navajo Mountain, and Nelson's record indicates that it utilizes the streamside forests even at low altitudes.

RED-EYED VIREO . . . *Vireo olivaceus*

(Hypothetical)

The only available record is an observation of a singing male at Keams Canyon, June 6, 1937, by Monson. There is a specimen from Flagstaff, Arizona, in the M.N.A. which increases the plausibility of this record.

WESTERN WARBLING VIREO . . . *Vireo gilvus swainsoni*

A summer resident on Navajo and Lukachukai Mountains and a migrant through the canyons.

Specimens: ♀, June 21, 1927, Lukachukai Mountains, Arizona (Cantwell, USBS). Adult ♀, July 7, 1936, 9500 feet, aspen and spruce, near top of Navajo Mountain, San Juan County, Utah (UU). Adult ♂, July 29, 1936, 6500 feet, pigmy forest, Navajo Mountain Trading Post, San Juan County, Utah (UU). Juvenile, July 30, 1935, 6800 feet, aspen, Betatakin Canyon, Tsegi drainage, Navajo County, Arizona (UU). ♂, ♀ and juvenile, August 29, 1937, 7000 feet, aspens, Kaiparowits Plateau, Kane County, Utah (UU). Adult ♂ and ♀, August 4, 1936, 6000 feet, oaks in Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♀, August 13, 1936, mixed vegetation, Tsegi Canyon one mile above mouth, Navajo County, Arizona (MNA). Adult ♀, August 17, 1935, 9500 feet, aspen, Soldier Seep, Navajo Mountain, San Juan County, Utah (GC).

Observations: Cantwell (USBS) found this bird in the Lukachukai Mountains in late June, 1927, where it must have been breeding. Benson (1935:443) saw several in the cottonwoods near Navajo Mountain Trading Post, Utah, June 25, 1933. Wetherill recorded it in Betatakin Canyon about 30 times between August 1 and October 15 in the years 1934-36, and on April 26, May 2 and July 30. Monson saw it at Keams Canyon, May 19, 20, 25, and August 28, 1937, and at Tees-nos-pas September 15, 1936. R.B. M.V. expeditions (Hargrave, Russell, Woodbury) have nearly a dozen records. Several of these come from the aspens on the upper levels of Navajo Mountain at altitudes of 9000-10,500 feet where the birds were breeding, July 6-21, 1936. Others, probably in migration, are recorded from such scattered localities as Pasture Canyon in cottonwoods, June 23, 1938; Navajo Mountain Trading Post in cottonwoods, July 28-29, 1936; Beaver Creek Canyon, Utah, in oaks willows and aspens, August 2-10, 1936; and Water Lily Canyon (Tsegi drainage), August 10, 1934.

Comment: The records of April 26 and May 2 in Betatakin Canyon probably represent birds in northward migration. The record of June 21, 1927, in Lukachukai Mountains and those of July 6-21, 1936, on Navajo Mountain undoubtedly represent breeding populations. Presumably it also breeds in the cottonwoods at Navajo Mountain Trading Post, reported June 25, 1933, in the aspens of Betatakin Canyon, reported July 30, 1935, and similar places. It appears to begin migration in late July. Our earliest record of an undoubted migrant is July 23, 1938, in the cottonwoods of Pasture Canyon. Soon after this, in late July and early August, migrant birds arrived in large numbers and spread through the streamside cottonwoods and willows as well as the oaks of canyon heads and mountain slopes. The bulk of migration seems to have passed by the end of September but records are known as late as October 15. The only data concerning breeding time is the record of two adult birds feeding young among the aspens on Navajo Mountain on July 16 to 18, 1936, which correlates very closely with the time of migration in late July.

ORANGE-CROWNED WARBLER . . . *Vermivora celata*

Migrant. Specimens: ♀, mid-May, 1858, near Fort Defiance, Arizona (Mollhausen, USBS).

Observations: Mollhausen (Baird 1861:5) on the Ives Expedition (1858) took the specimen listed above. Wetherill has observed it both spring and fall in Betatakin Canyon, undoubtedly in migration. He noted it May 1, 2 and 12, 1936, where he saw it feeding in birches and willows in the canyon. In southward migration he has records of August 12, 31, 1936, August 23-29, 1934, August 29, 1935, September 1-21, 1934, and September 29, 1937. Monson has spring records at Bluebird Springs near Keams Canyon, May 6, and at Toreva in fruit trees May 14, 1937, and fall records at Keams Canyon, August 28, 1937, September 30 and October 12, 1938, at Oraibi, August 22, 24, 1938, and at Sawmill on Defiance Plateau, October 2, 1936.

Comment: These observations probably apply chiefly to *V. c. oresteria* but there seems to be no reason why *V. c. celata* should not occur, but lack of specimens prevents determination. There is no evidence to indicate breeding in the Navajo Country. The records, May 1-14, indicate northward migrations and those of August 12 to October 2 southward migration.

CALAVERAS WARBLER . . . *Vermivora ruficapilla ridgwayi*

A migrant, lingering in shrubbery at almost any altitude from 4500 to 8500 feet.

Specimens: Adult ♀, August 11, 1935, 8500 feet, ponderosa pine forest, southwest side of Navajo Mountain, San Juan County, Utah (UU). Juvenile ♀, August 17, 1936, 4500 feet, willow and reed tangle, East Gypsum drainage, six miles below (north of) Totem Pole, Monument Valley, near Utah-Arizona line (UU).

Observations: Russell found it abundant on Navajo Mountain, August 9-17, 1935, and saw several in the shrubbery around War God Spring the next year on August 13, 1936. The next day, August 14, he saw one in the shrubbery at Wetherill's ranch. Kayenta, Navajo County, Arizona, and several each day in the reeds and willows of the Gypsum Jungle, Monument Valley (Arizona-Utah), August 16-18, 1936, and another one near the upper lake in Pasture Canyon, September 7, 1938. Woodbury found one near the Tuba City reservoir, August 21, 1938.

Distribution: We have no data on its northward migration. The southward movement appears to take place in August and September; our dates lie between August 9 and September 7. It is characteristically a bird of the low shrubbery, which seems to attract it at almost any altitude from 4500 to 8500 feet. The birds were very common in migration in the shrubbery on Navajo Mountain and they have been observed in shrubbery near Tuba City, Kayenta and Monument Valley.

VIRGINIA WARBLER . . . *Vermivora virginiae*

A breeder in deciduous brush, oaks and aspens, 6000 to 10,000 feet.

Specimens: Adult ♀, May 11, 1933, near Bluff, Utah (UU). Adult and juvenile ♂, June 22, 24, 1934, 6700 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). ♂, June 27, 1933, Skeleton Mesa, Arizona, 8000 feet (MVZ). Immature ♂, July 17, 1936, 10,000 feet, aspens, near top of Navajo Mountain, San Juan County, Utah (UU). Immature ♂, July 18, 1935, 7000 feet, oaks, Long Canyon at Ladder House, Tsegi drainage, Navajo County, Arizona (UU). Immature ♂, July 19, 1936, 6700 feet, oaks, Water Lily Canyon, Navajo County, Arizona, full grown (MNA). Adult, July 21, 1934, 6900 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). Juvenile, July 28, 1935, 6600 feet, Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (UU). Juvenile ♀, August 1, 1937, 7000 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). August 9, 1937, 7000 feet, pigmy forest near oaks, Kaiparowits Plateau, Utah (UU).

Observations: Wetherill noted it several times in deciduous brush such as birch and willow in Betatakin Canyon between May 1 and June 16 in years 1933-36. Hargrave reported it in several of the Tsegi canyons (Kiet Siel, Dogoszhi, Water Lily), mainly in deciduous brush of various kinds including oaks, June 17, 20-22, 24, 26-27, in years 1933-34, including a record of young being fed outside of nest by adults with badly worn feathers, July 22, 1934. Russell found it in Long and Bubbling Springs canyons (Tsegi drainage), June 28, 30, July 2-4, 18-19, 28, 1935, from 1 to 9 each day, and saw from 2 to 8 in willows and aspens on Navajo Mountain, July 17, 21 and 22, 1936. Teall saw it daily in deciduous brush in Water Lily Canyon, August 3-6, 1934. Phillips saw one in Lower Tsegi Canyon, August 13, 1936.

Monson found it near Keams Canyon several times during the summer of 1937, on May 6, June 24, July 12, August 13 and 28, indicating that it probably breeds there. He also saw one at Roof Butte in Tunicha Mountains June 24, and two at Oraibi, August 24, 1938.

Comment: This warbler is a breeder of deciduous brush, oaks and aspens at altitudes of 6000 to 10,000 feet. The records indicate that it arrives in early May (perhaps earlier) and remains until late August (8/24/38), perhaps later. Young out of nest are recorded as early as June 22 and several juveniles were taken after that date.

LUCY WARBLER . . . *Vermivora luciae*

A summer resident breeding along the San Juan and Colorado rivers, possibly elsewhere.

Specimens: ♂, April 27, 1892, Riverview on San Juan River, Utah (AMNH). Adult ♀, July 13, 1936, 3200 feet, willow thickets, side canyon of Colorado River, San Juan County, Utah (UU). Adult ♀, August 8, 1938, 3180 feet, willows and squawbrush on bar 41 miles above Lee's Ferry on Colorado River, Kane County, Utah (UU).

Observations: Phillips observed two small gray birds in weeds by an irrigation ditch on Moencopi Wash below Tuba City, July 2-5, 1936, which he believed were of this species. Lyons noted it twice in willow thickets along Colorado River, July, 1936. Woodbury saw a young bird out of nest being fed by parent on an oak covered bar on banks of Colorado River, about two miles below San Juan, 3250 feet, July 17, 1937. Woodbury and Russell noted single birds in streamside vegetation at points on San Juan river 30 miles above its mouth, July 31, and on Colorado river 41 and 1 mile above Lee's Ferry. August 8 and 10, 1938.

Distribution: This tiny retiring warbler is not often observed and it may be much more widespread than our observations indicate. We have definite records only from the banks of the San Juan and Colorado rivers, where its breeding status was established by the taking of a specimen (later lost while boating down the river) of a young bird out of nest being fed by an adult. Phillips reported probable observations near Tuba City. It is undoubtedly a sparse inhabitant of the willow and brush thickets along the San Juan and Colorado rivers for it has been observed on three different boating trips down the streams. Our observations of it cover the period July 13 to August 10, but these dates doubtless do not mark the limits of its stay. Rowley's record of April 27, 1892, is the only spring record available.

ALASKA YELLOW WARBLER . . . *Dendroica aestiva rubiginosa*

A casual migrant, possibly accidental.

Specimens: Immature ♂, August 2, 1934, oaks in Water Lily Canyon. Tsegi drainage, Navajo County, Arizona (MNA Z8.376). Hargrave (1936a, 121) reported 32 specimens of this subspecies from Tsegi Canyons, Oraibi Wash and elsewhere. Our data suggest the need for a restudy of the specimens.

Discussion: Despite the assignment of Hargrave of many specimens from the Tsegi Canyons and elsewhere to this race, we regard it is an accidental or sparse migrant, the majority of specimens being assigned with confidence to *D. a. morcomi*.

CALIFORNIA YELLOW WARBLER . . . *Dendroica aestiva brewsteri*

A sparse migrant. **Specimens:** Immature ♂, ♀, August 3, 1934, oaks in Water Lily Canyon, Tsegi drainage, Navajo County, Arizona (MNA Z8 381, Z8.440). Immature ♂, August 3, 1938, oaks and willows along Colorado River on bar three miles below mouth of San Juan River, Kane County, Utah (UU 4325). ♂, August 24, 1932, Oraibi Wash, Navajo County, Arizona (MNA 3419).

Discussion: Specimens of this race have been taken sparingly from among the more abundant migrant race *D. a. morcomi*, but they have not been distinguished in observations. It is evidently a sparse migrant (August 3-24).

EASTERN YELLOW WARBLER . . . *Dendroica aestiva aestiva*

A sparse migrant, possibly accidental. **Specimens:** ♂, May 4, 1892, Riverview on San Juan River, Utah (AMNH 57837). Identity of this specimen checked by Allan R. Phillips.

WESTERN YELLOW WARBLER . . . *Dendroica aestiva morcomi*

An abundant migrant at all altitudes, mainly in April-May and late July to mid or late September.

Specimens: Immature ♂♂, July 22, 23, 1937, 3200 feet, streamside thickets along Colorado River near mouth of Rock Creek, Kane County, Utah (UU 5223, 5226, 5228). Immature ♂, August 3, 1938, oaks and willows along Colorado River on bar three miles below mouth of San Juan River, Kane County, Utah (UU 4335). ♀, August 4, 1937, 7000 feet, sagebrush on Kaiparowits Plateau, Kane County, Utah (UU 5155). Immature ♀, August 13, 1934, Water Lily Canyon, Tsegi drainage, Arizona (MNA Z8.484). Juvenile ♂, August 13, 1935, aspens near War God Springs, Navajo Mountain, San Juan County, Utah (UU 5663). ♂, August 25, 1909, Lee's Ferry, Arizona (USBS 205654).

Observations: Merriam (1890:98-99) found yellow warblers, presumably of this race, common in the cottonwoods along the Little Colorado River, August 12, 1889; reported several in the reeds of Tennebito (Dinnebito?) Wash, August 17, and saw several in the bushes (squawberry?) near the spring on Moa Ave (Moenave), September 21 of the same year, all undoubtedly migrants. Skinner (USBS) found a migrant at Holbrook, September 11, 1916. Wetherill noted it in migration at Betatakin between April 28 and May 9, 1935. The R.B.-M.V. expeditions (Hargrave, Teall, Russell, Woodbury) have 25 recorded observations of migrant birds presumably of this race from many places: Monument Valley, Kayenta, Tsegi Canyons, Navajo Mountain regions, Beaver Creek Canyon, Kaiparowits Plateau and even along the San Juan and Colorado Rivers among the resident population of *D. a. sonarana*. Monson has 22 recorded observations presumably of this race, of which 10 records (11 birds) were in May and 12 records (29 birds) in August, 1937-8, mainly from the region around the Hopi villages but also from near Leupp along the Little Colorado River.

Discussion: The migrant races of Yellow Warbler are found in many places and at many altitudes (3200-8500 feet). We have no evidence of breeding of this race in the Navajo Country. Fall migration appears to begin in late July. Specimens of this race (identified by J. W. Aldrich) were taken on the Colorado River near the mouth of Rock Creek as early as July 22-23,

1937, where they were intermixed with the local breeders *D. a. sonora*. The main wave of migration seems to begin about the first of August. It consists mainly of this race but appears to contain a sprinkling of members of the races *brewsteri* and *rubiginosa*. In the deciduous growth of the Tsegi Canyons the fall migration is very striking. In June and July there are none. Then suddenly in the first week in August a few appear and within a week the oaks seem to be full of them. These migrants are mainly young birds. By the end of August this wave is over, but while it lasts the birds are to be seen not only in the canyons but also far out on the desert flats (Kaiparowits, August 4, 1937), in the cottonwoods (Kayenta, Navajo Mountain Trading Post) and even in the aspens on Navajo Mountain at 9000 feet. Most specimens taken in all these places have turned out to be *morcomi*. The spring migration of this population is probably represented by four records between April 28 and May 9 in Beta-takin Canyon (Wetherill) but is doubtless more extended. Fall migration extends from late July (22-23) to mid or late September (11, 21).

SONORA YELLOW WARBLER . . . *Dendroica estiva sonora*

A common breeder in streamside thickets along the San Juan and Colorado rivers, 3100 to 3700 feet, and around Tuba City, 5200 feet.

Specimens: (Checked by J. W. Aldrich and A. R. Phillips). Juvenile ♀, July 9, 1936, two miles southwest of Tuba City, Arizona (MNA Z8.745). Adult ♀, juvenile ♂, July 11, 1936, 3200 feet, mouth of side canyon on Colorado River, San Juan County, Utah (UU 4330, 4338). ♂ ♂, July 20-23, 1937, streamside thickets on Colorado River near mouth of Rock Creek, Kane County, Utah (UU 5216, 5224, 5229). Immature, July 30, 1938, willows on bar 35 miles up San Juan River, San Juan County, Utah (UU 4334). Immature ♀ ♀, August 3, 1938, oaks and willows along Colorado River on bar three miles below mouth of San Juan River, Kane County, Utah (UU 4329, 4337). Adult ♂ and nest, August 5, 1938, 3220 feet, willows on bar 63 miles above Lee's Ferry, on Colorado River, San Juan County, Utah (UU 4327, 4347). Adult and immature ♂, August 6, 1938, willows on bar 50 miles above Lee's Ferry, on Colorado River, San Juan County, Utah (UU 4332-33). Immature ♀, September 6, 1938, in weeds three miles SW of Tuba City, Arizona (UU 4328).

Observations: Phillips found *D. a. sonora* breeding in the Tuba City vicinity July 2-9, 1936, where he saw both singing males and young birds. The R.B.-M.V. expeditions (Lyons, Russell, Woodbury) have a dozen records of the breeding bird *D. a. sonora* along the San Juan and Colorado rivers in July and August, 1936-38.

Discussion: The Sonora Yellow Warbler is a breeder of the lower altitudes below 6500 to 7000 feet, chiefly in the streamside willows, brush or cottonwoods. It overlaps the habitat of the yellowthroat in the streamside willows, but the warbler extends landward into the trees (cottonwoods) whereas the yellowthroat extends more toward moister situations into the cattails and rushes. The yellow warbler is primarily a bird of the deciduous vegetation. We have no information about the movements of the breeding race; we have never taken it except on its breeding range. It was still on its breeding area near Tuba City, September 6, 1938. During the 1938 trip down the San Juan and Colorado rivers, we found it occupying the streamside fringes of willows and brush. During late July and early August the young birds were all out of the nests and were sometimes distributed in family groups in what appeared to be territorial fashion. A fresh empty used nest was found on August 5. It was

located seven feet up in the forks of a willow, made of soft gray plant fibers lined with finer fibers and a small quantity of plant down. The cup was $1\frac{1}{8}$ inches deep and 2 inches in diameter.

ROCKY MT. AUDUBON WARBLER . . . *Dendroica auduboni memorabilis*

A spring (April, May) and late summer (August) migrant and a breeder on Navajo and Lukachukai Mountains and probably on Defiance Plateau.

Specimens: ♂, April 27, 1892, Riverview on San Juan River, Utah (AMNH). Skin, April 28, 1935, near Bluff, Utah (UU). Adult ♂, April 30, 1938, Wetherill Ranch, Kayenta, Navajo County, Arizona (MNA). Two ♀, June 20, 21, 1927, Lukachukai Mountains, Arizona (Trapier, USBS). Adult ♂, July 2, 1936, 8500 feet, ponderosa pines, War God Spring, Navajo Mountain, San Juan County, Utah; one of a pair with a nest high in a pine, and was carrying a larva (UU). Juvenile ♀, August 11, 1935, 8500 feet, ponderosa pines, SW side of Navajo Mountain, San Juan County, Utah (GC).

Observations: Rowley (AMNH) found the bird near Riverview on the San Juan River, Utah, April 27, 1892. A University of Utah expedition found it near Bluff, also on the San Juan River, April 28, 1935. Benson (1935:445) saw it daily July 12-27, 1933, in the ponderosa pine and spruce-fir forests on Navajo Mountain, Utah. Wetherill took a bird from a cat at Kayenta April 27, 1934; noted its presence in Betatakin Canyon, April 22, 1936, May 9, 1935, and May 14, 1936; and saw a large flock in Kiet Siel Canyon, May 4, 1936. Russell found it abundant in the ponderosa pine and spruce-fir forests on Navajo Mountain, July 2-18, 1936, and reported it abundant in the pigmy conifers around the base of the mountain, August 9-17, 1935, probably a post-breeding spread. Monson has 35 recorded observations of 125 birds from 23 localities well distributed over the Navajo Country. These records all occur in the spring between April 13 and May 25 and in the fall between August 20 and October 14. They are distributed as follows: 2 records of 2 birds in April, 13 of 24 birds in May, 2 of 2 birds in August, 7 of 32 birds in September, and 11 of 55 birds in October. Monson thinks it does not winter in the Navajo Country.

Distribution: This warbler migrates through the Navajo Country in spring and fall and a few stop to breed on Navajo Mountain, the Lukachukai Mountains and probably Defiance Plateau. The breeding range seems restricted to altitudes of about 8000 and 10,000 feet, but the migration range is not so restricted and small numbers appear in the pigmy forest or even among the valley trees of cottonwoods or exotics. Monson's dates are the best available indication of migration, April 13 to May 25 in spring and August 20 to October 14 in fall.

Breeding Notes: That they breed on Navajo Mountain seems assured from Russell's records of birds carrying food to young in nest from July 2 to 18, a few young birds out of nest on July 4 and many young out of nest July 18. Apparently the broods emerge from the nests in July and scatter out in August.

BLACK-THROATED GRAY WARBLER . . . *Dendroica nigrescens*

A common summer resident of the pigmy conifers at least from mid-April to late August.

Specimens: Adult ♂, May 11, 1933, near Bluff, Utah (UU). Specimen, mid-May, 1858, Fort Defiance (Ives Exped., Baird 1861:5). Adult ♀,

June 24, 1934, Water Lily Canyon, Navajo County, Arizona (MNA). June 26, 1933, 8000 feet, Skeleton Mesa, Arizona (MVZ). July 2, 1938, adult ♀, 6600 feet, pigmy forest, near Marsh Pass, Navajo County, Arizona (UU). Immature ♂, July 13, 1934, 6800 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). July 23, 1933, Segi-ot-sosie Canyon, Arizona (MVZ). Adult ♂, July 26, 1935, 8000 feet, aspens, Mesa-top Spring, Skeleton Mesa, Tsegi drainage, Navajo County, Arizona (GC). ♂, July 31, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau, Utah (UU). Adult, August 2, 1936, 6000 feet, pigmy forest, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Juveniles and ♀, August 4, 5, 9, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau, Utah (UU). Adult, August 11, 1934, head of Dogoszhi Biko, Tsegi Canyon (MNA). Adult ♂, August 14, 1935, 9000 feet, SW side of Navajo Mountain, San Juan County, Utah (GC).

Observations: Mollhausen took a specimen in vicinity of Fort Defiance in mid-May, 1858. A University of Utah expedition found it near Bluff on the San Juan River in Utah, May 11, 1933. Benson saw several in the pigmy conifers on the southwest slope of Navajo Mountain near Rainbow Lodge, June 15, 1933. Jenks reported two birds (singing) at a little natural bridge five miles southwest of Fort Defiance, June 22, 1933. Wetherill has 16 records from Betatakin Canyon between April 26 and August 27, 1935-6, and two from Kiet Siel in May. The R.B.-M.V. expeditions (Hargrave, Russell, Teall, Woodbury) have more than 40 records between June 18 and August 23, 1933-38, mainly in the pigmy conifers, but sparingly in the ponderosa pines and spruce-fir forests probably as post-breeding wanderers. These come mainly from the Tsegi canyons, but also from Black Mesa, Arizona, and Kaiparowits Plateau and Navajo Mountain, Utah. Monson has 15 records of 26 birds between April 15 and August 11, 1937-38, almost entirely from the pigmy conifers and mainly from localities around the Hopi villages. He found it breeding near Jeddito, the Hopi Buttes and Bahlakai Mesa.

Distribution: This inconspicuous bird is considered to be a common nesting warbler of the Upper Sonoran pigmy conifers, nearly obligate in that habitat, although there is some evidence to indicate that it may ascend sparingly into the oaks and yellow pines, and even into the spruce-fir forest in its post-breeding wanderings. However, the yellow pine habitat is so small and the bird is so widespread in the pigmy conifers, that its Transition Zone habitat is nearly negligible by contrast. Out of more than 50 recorded observations, only two appear to be from habitats above the pigmy forest. It is a widespread bird, having been recorded from Kaiparowits Plateau and Navajo Mountain region in Utah, many of the Tsegi canyons, four of the mesas (Black, Skeleton, Bahlakai, Tyende), Marsh Pass, Keams Canyon and Hopi villages, Arizona. It is probably well distributed throughout the dense portions of the pigmy forests. The altitudinal range is mostly between 6000 and 8000 feet, but it has been observed as high as 9000 or 10,000 feet. It is definitely a widespread breeder, arriving as early as April 15 (Monson). Courtship and early nesting have not been observed, but adults carrying food to young, both in and out of nest, have been observed in late June (25-30). Further observations of young being fed out of nest extend all through July to August 3. The latest dates are August 13 (Russell) and 27 (Wetherill). Presumably they migrate in late August. One nest was observed (Hargrave) in an upright fork of a low juniper, poorly protected from the sun by thin boughs, containing four birds nearly ready to leave on June 25, 1933.

TOWNSEND WARBLER . . . *Dendroica townsendi*

A sparse migrant passing southward over the area in August. Our records are singularly close together, August 10, 12 and 13. None of them are below 6000 feet. Presumably it would frequent the mountain tops later in fall and in the spring.

Specimens: Adult, August 10, 1936, 6000 feet, ponderosa pine, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). This was the only record of 1936; collected from a solitary pine among oaks and willows. ♀. August 12, 1937, 7000 feet, pigmy forest, Kaiparowits Plateau, Utah (UU).

Observations: August 13, 1935, Navajo Mountain; a single record of two seen (HNR).

HERMIT WARBLER . . . *Dendroica occidentalis*

A migrant through the area at high altitudes, no doubt frequenting mountain tops but available data are too meager for general conclusions.

Specimens: Adult ♀, August 11, 1935, 8500 feet, ponderosa pines, SW side of Navajo Mountain, San Juan County, Utah (GC). Immature ♀, August 13, 1936, 10 000 feet, near top of Navajo Mountain, San Juan County, Utah; two seen (UU).

Observations: 1935, the Hermit Warbler was a common member of the bands of migrant warblers found on Navajo Mountain in August (HNR).

GRACE WARBLER . . . *Dendroica graciae graciae*

A breeder of the yellow pines, having been reported only three times from Navajo Mountain and Black Mesa. Twice on Black Mesa adults were observed feeding young. The dates range from June 15 to July 16, but these are undoubtedly not terminal dates.

Specimens: Adult ♀, July 11, 1938, 7300 feet, 13 miles SW of Marsh Pass, Black Mesa; in a little canyon full of yellow pines, two birds were noted moving through the pines. One was a young bird being tended by the adult—the adult was collected (UU). Adult ♂ and immature ♀, July 16, 1938, 7300 feet, ponderosa pine, Black Mesa near Coal Mine, Navajo County, Arizona; adult feeding young (UU).

Observations: June 15, 1938, Navajo Mountain, Utah; one was taken (but not prepared as a specimen) on June 15 at War God Spring and one was seen June 16. Seen and heard only among the yellow pines, they were not numerous (Benson: 1935).

GRINNELL WATER THRUSH . . . *Seiurus novboracensis notabilis*

Occasional migrant. **Specimens:** Adult ♂, May 11, 1933, small stream near Bluff, Utah, on banks of San Juan River (UU). **Observations:** May 15, 18-20, 22, 1937, single bird of this species (Monson 1939:168) observed on these dates at Keams Canyon.

MACGILLIVRAY WARBLER . . . *Oporornis tolmiei*

A common migrant, possibly a breeder. **Specimens:** Juvenile ♀, August 5, 1936, 6000 feet, Beaver Creek Canyon, north foot of Navajo Mountain,

San Juan County, Utah; collected from willows in the canyon bottom (UU). Immature ♀, August 16, 1936, 4500 feet, East Gypsum Drainage, eight miles below Totem Pole, San Juan County, Utah; collected from reeds and narrow leafed willows (UU). Adult ♂, August 21, 1938, 5300 feet, tall weeds near reservoir, near Tuba City, Coconino County, Arizona (UU). ♂, October 27, 1931, near Bluff, Utah (UU).

Observations: A University of Utah expedition found it near Bluff on the San Juan River, Utah, October 27, 1931. Wetherill has one record from Betatakin Canyon, May 22, 1936. Russell and Woodbury have 11 records between August 13 and September 7, 1936-38, from Navajo Mountain, Beaver Creek Canyon, Utah; Monument Valley, Pasture Canyon and Tuba City, Arizona. Monson has 6 records, of which 3 are in May (22, 25, 26), 2 in August (18, 28) and 1 in October (12) from Keams Canyon, Hotevilla and Moenave.

Comment: Available data do not indicate breeding. It is undoubtedly a migrant. Available spring dates are all in May (22-26), but these are undoubtedly inadequate. Fall dates range from August 5 to October 12. There is nothing to prove that the early August records are not post-breeding wanderers. It appears to migrate through the lowlands, where it is found among shrubbery and thickets. Monson thinks it probably breeds on Navajo and Lukachukai Mountains.

WESTERN YELLOW-THROAT . . . *Geothlypis trichas occidentalis*

A breeder below 6000 feet in moist habitat with willow, brush or cattails.

Specimens: Skin, April 28, 1935, near Bluff, Utah (UU). Adult ♂, July 7, 1936, Pasture Canyon, NE of Tuba City, Arizona (MNA). Adult and juvenile ♂, July 12, 1936, 3200 feet, side canyon of Colorado River below mouth of Bridge Canyon, San Juan County, Utah (UU). Juvenile ♂, ♀, 3300 feet, July 20-26, 1937, streamside thickets on Colorado River near mouth of Rock Creek, Kane County, Utah (UU). Adult ♂, ♀ and immature ♂, July 21, 1938, 5300 feet, willows and reeds, Pasture Canyon, near Tuba City, Coconino County, Arizona (UU). Immatures ♀ and ♂, July 29, 30, 1938, 3500 feet, willows and reed canes on bars 45, 35 and 18 miles up San Juan River, San Juan County, Utah (UU). Nest only, August 5, 1938, 3225 feet, willows on bar 63 miles up Colorado River from Lee's Ferry, San Juan County, Utah (UU). Immature ♀, August 6, 1938, 3200 feet, squawbrush on bar 60 miles up Colorado River from Lee's Ferry, San Juan County, Utah (UU). Nest only and adult ♂, August 9, 1938, 3150 feet, willows, bar 25 miles up Colorado River from Lee's Ferry, Coconino County, Arizona (UU). Adult ♂, August 13, 1938, 5400 feet, cattails in Pasture Canyon near Tuba City, Coconino County, Arizona (UU).

Observations: Phillips found yellowthroats breeding in the Tuba City region, especially in Pasture Canyon where he heard males singing and saw a female feeding young July 4-9, 1936. Woodbury found family flocks out of nest July 20-26, 1937, in the streamside thickets along the banks of the Colorado River near the mouth of Rock Creek, Kane County, Utah. Woodbury and Russell found them at Tuba City Reservoir and in Pasture Canyon in post-nesting distribution July 20-23, August 12, 13 and 22, and September 6-7, 1938. On a trip from the mouth of Nokai Canyon down the San Juan and Colorado rivers to Lee's Ferry, Arizona, July 29 to August 11, 1938, they encountered many birds, most of them distributed in family groups all the way along the fringing thickets that lined the streamside bars in the narrow

canyons. Monson noted yellowthroats at Keams Canyon, May 20, 24 and 26, 1937, September 30, 1938, and at Oraibi, May 24, 1937, all probably migrants.

Discussion: The blackmasked male yellowthroat and his plainer mate are breeders in moist habitats of willows, reed canes, brush or cattails in the canyons or valleys below 5500 to 6000 feet. Streamside fringes of willows and the cattail borders of ponds and lakes are favorite haunts. It is a very common inhabitant of the thickets of willows, squawbush and other brush along the banks of the San Juan and Colorado rivers, 3500 to 3100 feet, and the cattails and willows of Pasture Canyon, 5300 to 5500 feet. They are also reported from Tuba City springs and reservoir and from a water hole near Moencopi. The young birds were first noted out of the nest July 20, 1937, on Colorado River. They became easy to locate along the narrow bars of the San Juan and Colorado rivers where the willow fringes are often narrow. Censuses along various bars in 1938 tended to yield large numbers of birds, which we learned to sort into family groups. At this time, the families were dispersed in what appeared to be territorial fashion, spaced at somewhat regular intervals along the willow fringes. In the cattails of Pasture Canyon they were exceedingly numerous. The only evidence of migration are the records of Monson, May 20-26 and September 30. He regarded them as rare.

LONG-TAILED CHAT . . . *Icteria virens auricollis*

A summer resident, breeding in the streamside thickets of the lower altitudes.

Specimens: Two ♂, May 15, 17, 1892, near Bluff on San Juan River, Utah (AMNH). Adult ♂, July 11, 1936, 3200 feet, willow thickets in side canyon of Colorado River, San Juan County, Utah (UU). Adult and immature ♀, July 23, 1938, 5400 feet, squawbush, Pasture Canyon near Tuba City, Coconino County, Arizona (UU). Immature ♂, July 31, 1938, 3400 feet, willows, bar 34 miles above Colorado, San Juan River, San Juan County, Utah (UU). Nest only, July 31, 1938, 3400 feet, greasewood near willows, bar 26 miles up San Juan River, San Juan County, Utah (UU). Adult ♀, August 7, 1938, 3200 feet, squawbush, caught in mouse trap, bar 50 miles up Colorado River from Lee's Ferry, San Juan County, Utah (UU). Adult ♂, August 8, 1938, 3200 feet, willows, bar 41 miles up Colorado River above Lee's Ferry, Kane County, Utah (UU 4355).

Observations: On a trip down the San Juan and Colorado rivers in July, 1936, Lyons recorded it only twice in the fringing streamside thickets. Monson (1939:168) saw an adult bird at Keams Canyon, Arizona, October 12, 1937, undoubtedly a late migrant. Woodbury and Russell found a family out of nest in squawbushes in Pasture Canyon near Tuba City, Arizona, July 23, 1938. On a trip from the mouth of Nokai Canyon down the San Juan and Colorado rivers to Lee's Ferry, Arizona, July 30 to August 11, 1938, they recorded it every day, mainly in family groups in the densest thickets on the bars fringing the streams.

Discussion: The Long-tailed Chat has been observed by us only along the San Juan-Colorado rivers (3500-3100 feet) and in Pasture Canyon (5400-5600 feet), but it probably occurs in many of the tributaries of the Colorado River, especially those with permanent streams, bearing stream bank thickets.

It is such a secretive bird that it seems to have been missed on most of the expeditions. It was observed twice on the Colorado in 1936, but in 1938,

when careful search was made, it was found many times. One empty nest believed to belong to this species, was found, while birds were found alone, in pairs and in family groups.

NORTHERN PILEOLATED WARBLER . . . *Wilsonia pusilla pileolata*

A sparse migrant passing through the area, northward in May, southward from August 9 to October 22, noted mostly at altitudes above 5000 feet.

Specimens: Immature ♀, August 22, 1938, 5200 feet, $\frac{1}{2}$ mile north of Moencopi, greasewood and sweet clover, Coconino County, Arizona (UU).

Observations: Streater (USBS) saw two birds in the brush by the Little Colorado River somewhere in the vicinity of Winslow or Holbrook some time between April 19 and May 7, 1893. Goldman (USBS) saw several in willows on Spruce Creek in the Tunicha Mountains at about 9000 feet altitude on August 24, 1917. Wetherill noted birds in Betatakin Canyon, May 14, 16, 17, 1935, September 1, 1940. Phillips saw two birds in a row of bushes by an irrigation ditch lying between the road and the lake along highway U. S. 66 between Joseph City and Holbrook, May 4, 1937. Russell (R.B.-M.V.) saw one near War God Spring, September 1, 1934, and one or two daily in the aspens on Navajo Mountain, August 9-16, 1935; and one in Pasture Canyon near Tuba City, September 7, 1938. Woodbury saw one in the meadows of Pasture Canyon, August 22, 1938. Monson has 12 records (18 birds) May 11-26, 3 records (15 birds) August 23, 24, 28, and one bird each September 30 and October 12, 1937-38. These are mostly from Keams Canyon, but also include Hotevilla, Oraibi, Wildcat Mesa and Hard Rocks Diversion Dam north of Oraibi.

Discussion: We have no evidence of breeding in any of the mountains. It is undoubtedly a migrant. Known dates range from May 4 to 26 and from August 9 to October 22, which indicates that the fall migration is much more widespread than that of spring. They seem to migrate singly or in small numbers.

ENGLISH SPARROW . . . *Passer domesticus domesticus*

A permanent resident about the white man's habitations, with few exceptions.

Specimens: Adult ♂, July 12, 1938, 6300 feet, cottonwoods, Shonto Trading Post, Navajo County, Arizona (UU). Immature ♀, skeleton, October 7, 1937, 5680 feet, Kayenta, Navajo County, Arizona (MNA).

Observations: Phillips suggests that this exotic species doubtless arrived in the Navajo Country in 1906 or 1907. Nelson (USBS) found it common at Fort Defiance July 30 and Ganado August 6, 1909; reported it "becoming common" at Winslow and Holbrook and saw it in lesser numbers at Adamana and Navajo Springs in late July of the same year. Skinner (USBS) saw about 50 at Keams Canyon in mid-September, 1916. It was found generally distributed over Arizona 1916-18 by U.S.B.S. men. Hargrave found it common around the trading post at Oraibi 1928-37 and numerous in Winslow, December 26, 1930, and January 4, 1931. Jenks found it common at St. Michaels. June 21, Fort Defiance, June 21, 22, and saw several at Ganado June 24-26, 1933. Stevenson saw many about the buildings at Oraibi, July 29, 1934. Phillips found it common at Tuba City and at the ranches on Moencopi Wash two miles distant July 2-9, 1936. The R.B.-M.V. expeditions (Hargrave, Russell, Woodbury) found it common at Kayenta, June 8 and July 14, 1933.

March 23, 1934, and July 14, 1938; common at Tonalea, June 8, 1933, but absent July 24, 1938; common in Shonto Canyon at the trading post July 12-13, 1938; common at Pasture Canyon and abundant at Tuba City, September 6, 1938; common at Cameron, June 23-24 and July 24, 1938; and several birds at mouth of Paria Creek near Lee's Ferry, August 10, 1938. Monson (1937a:67) reported 150 birds on the Christmas Census, December 19, 1936, at Tuba City.

Discussion: The English Sparrow seems strangely out of place in the Navajo Country, but appears to persist permanently in small numbers in certain isolated spots near white men's trading posts and in large numbers in most of the towns and cities. It has a very spotted distribution and is exceedingly localized and well restricted wherever it is found.

BOBOLINK . . . *Dolichonyx oryzivorous*

Specimens: ♂, ♀, May 19, 1892, bluff on San Juan River, Utah (AMNH 57792, 57793).

WESTERN MEADOWLARK . . . *Sturnella neglecta*

A sparse permanent resident bird of the open grassy flats.

Specimens: ♂, June 22, 1933, 6600 feet, at a little natural bridge five miles SW of Fort Defiance (University of Arizona, Jenks). Adult ♀, July 6, 1936, farmlands, two miles SW and below Tuba City, Arizona (MNA). Adult and immature ♀, July 6, 1938, 6000 feet, grassy flat, four miles NE of Marsh Pass, Navajo County, Arizona (UU). Adult ♀, July 21, 1938, 5200 feet, meadows, Pasture Canyon near Tuba City, Coconino County, Arizona (UU).

Observations: Merriam (1890:95) reported it "tolerably common" at Moa Ave (Moenave) and also near Little Colorado River but not on the desert proper (August 12-19 and September 20-27, 1889). Loring (USBS) found it common in 1893 in small flocks in the fields at Bluff on San Juan River, Utah, November 8-15, and found stragglers at Noland's Ranch near 4-corners in Utah, November 17-27, but remarked that the majority had gone south. Jenks has several records from this region around St. Michaels and Fort Defiance, June 21-22, 1933. Phillips has some summer records of meadowlarks around Tuba City, July 2-9, 1936. Wetherill noted three October 1, 1936, 8-10 miles southwest of Marsh Pass. Russell and Woodbury (R.B.-M.V.X) have seven records well distributed along the flats from Kayenta to Tuba City and well distributed in time from June 24 to September 6, 1938. Some were singing males; others were families out of nest. Monson has 31 records well distributed through 11 months of the year and well distributed over valleys and mesas of the area. He says it is "generally, but scatteringly, distributed." Lockett has winter records of meadowlarks at Tuba City, December 15, 1938.

Distribution: The meadowlark is a scatteringly distributed year-long resident. It appears to inhabit the open flats and fields. The association with grassy meadows, irrigated fields and fenced areas containing grass is striking. Young birds out of the nest were found on July 6 at the same time adult singing males were observed holding territory.

YELLOW-HEADED BLACKBIRD . . . *Xanthocephalus xanthocephalus*

A migrant through the area, passing north in April-May and straggling southward from July to October.

Specimens: ♂, May 1, 1892, Riverview on San Juan River, Utah (AMNH). Immature ♂, July 12, 1938, 6300 feet, mulberry tree, Shonto Trading Post, Navajo County, Arizona (UU). ♂, July 15, 1909, two miles east of Winslow, Arizona (USBS, Birdseye). Adult ♀, July 21, 1938, 3200 feet, meadows, Pasture Canyon, Coconino County, Arizona (UU). ♀, July 27, 1933, Goodridge, Utah (MVZ).

Observations: Rowley (AMNH) found it on the San Juan River, Utah. May 1, 1892. Nelson (USBS) saw one bird at a ranch on the Little Colorado River near Winslow, July 12, and several July 15, 1909, and saw a small flock in the fields around Lee's Ferry on the Colorado River, August 23-26, 1909. Skinner (USBS) saw a flock of 30 at Ganado, September 19-20, and about 90 at Chin Lee, September 21, 23, 25, 1916, always associated with *Euphagus*. Wetherill reported a flock at Kayenta, April, 1934. Woodbury and Russell (R.B.-M.V.X.) have 12 records on July 12, 15, 21, 23, August 12-15, 19, 21-22, and September 7, 1938. These come from Shonto Canyon, Kayenta, Little Man's Lake, Cow Springs Lake and Pasture Canyon. They vary in number from one to 40 birds at one place. Monson has four records on May 5, 25, August 25, 1937, and October 11, 1938, at Keams Canyon. Hopi Buttes and Ganado.

Discussion: We have no evidence or indications that this bird is a breeder despite the fact that young birds have been taken as early as July 12. We have only three spring records, a flock reported by Wetherill in April, and two singles by Monson May 5 and 25, presumably in northward migration. The earliest summer record (July 12, 1938) comes from Shonto Canyon, where there are no suitable habitats for nesting purposes. A specimen of an immature bird was observed on the overgrazed meadow where it had no suitable cover, and was finally located in a mulberry tree at the trading post, where it had taken refuge. This is believed to have been one of the first vanguard of migrants from the north. Other stragglers of this type were observed at Kayenta, July 15, and at Pasture Canyon July 21 and 23. During August flocks of 15 to 40 were observed at Pasture Canyon, Cow Springs and Kayenta, in addition to several stragglers of one or two in a place. Four were observed as late as September 7. In general, they were found at the ponds or meadows. The straggling southward migration appears to range from July 12 to October 11.

UTAH RED-WING . . . *Agelaius phoeniceus utahensis*

A limited breeder along the upper San Juan River, Utah; at Pasture Canyon and along Little Colorado River, Arizona; and a numerous migrant and winter resident in certain favorable localities.

Specimens: Adult ♀, March 23, 1934, 5900 feet, Kayenta, Navajo County, Arizona (MNA). July 2, 1927, in marsh on San Juan River near Bluff, Utah (BYU). Adult ♂, July 9, 1936, farmlands, two miles SW of Tuba City, Arizona (MNA). ♂♂, ♀, July 12-14, 1909, two miles east of Winslow on Little Colorado River (Birdseye, USBS). Adult ♀, July 21, 1938, 5200 feet, marshes, Pasture Canyon, near Tuba City, Coconino County, Arizona (UU).

Observations: Loring (USBS) observed several small flocks and single birds on San Juan River near Bluff, Utah, November 8-15, and a single bird several times at Noland's Ranch near 4-corners, November 17-27, 1892. Birdseye found it on Little Colorado River two miles east of Winslow, July 12 and 14, 1909. Cottam found it in a marsh near Bluff on San Juan River.

Utah, July 2, 1927. Wetherill recorded eight at Kayenta Reservoir, March 23, 1934; found it common during the last week of April, 1934, and saw a flock of 10 November 29-30, 1941. Phillips found about 25 breeding in Pasture Canyon and vicinity (near Tuba City), July 2-9, 1936. On the last date he found young on the wing, a freshly used empty nest and a nest containing three fresh eggs. Russell and Woodbury (R.B.-M.V.X.) also found it at Pasture Canyon, July 20-24, August 12-13, 22, and September 6, 1938. These flocks were thought to contain 25-50 resident birds supplemented by migrants. They were seen daily while in the vicinity and numbers varied from a few to 200. Monson also found birds in the same general area (Moencopi, Tuba City and Moenave) during the winter from December 4, 1936, to February 19, 1937. Numbers observed run as high as 494 on December 19, 450 on January 26 and 280 on February 19, with lesser numbers on other dates. He also observed it at Ganado, Rock Point, Chin Lee, St. Michaels and Tonalea, all in fall, winter or early spring. He has one record from Roof Butte of two birds on June 24, 1938.

Discussion: The Redwing is a sparse breeder (25-50 pairs) at Pasture Canyon near Tuba City and probably on San Juan and Little Colorado rivers, and possibly near Roof Butte. It is also a much more numerous migrant and winter resident. The 1938 flock in Pasture Canyon concentrated at the upper reservoir for roosting at night in the cattails, but spread out into the surrounding country in the daytime, some going up through the fields and meadows in upper Pasture Canyon, others going down the stream past the lower reservoir and into the farms and fields of Moencopi Wash, while still others visited Tuba City and the city reservoirs. On the night of July 21, 1938, there appeared to be an extra large number roosting there, estimated at about 200 birds including a few yellow heads, doubtless representing a migration influx.

SCOTT ORIOLE . . . *Icterus parisorum*

Sparse breeder of the pigmy conifers.

Observations: May 20, 1937, Wildcat Mesa, 10 miles NW of Keams Canyon, Arizona, two males seen in pigmy conifers (Monson 1939:168). June 27, 1933, observed in the juniper-pinon zone, on the plain five miles south of Navajo Mountain, Coconino County, Arizona (Benson 1935:443). July 14, 1937, Hopi Buttes near Na-ah-ti Trading Post, Arizona, adult ♂ with nearly grown juvenile in pigmy conifers (Monson 1939:168).

Note: Twomey (1942:453) reports breeding birds with young out of nest June 25, 1937, in pigmy conifers about 20 miles SE of Vernal, Uinta County, Utah.

BULLOCK ORIOLE . . . *Icterus bullockii bullockii*

A breeding summer resident of the deciduous trees and thickets of stream-sides.

Specimens: ♂, May 8, 1892, Bluff on San Juan River, Utah (AMNH). ♂, July 2, 1927, common in cottonwoods at Bluff, Utah (BYU). Juvenile ♀, July 12, 1938, 6300 feet, mulberry and cottonwoods, Shonto Trading Post, Navajo County, Arizona (UU). Adult ♀, July 22, 1938, 5400 feet, bushes and willows, Pasture Canyon near Tuba City, Coconino County, Arizona (UU). Two ♂, July 15, 1909, two miles east of Winslow, Arizona (Birds-eye, USBs). Immature ♂, August 2, 1934, 6750 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♀, August 2, 1934, 6750

feet, Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♂, August 6, 1935, 6000 feet, cottonwoods, among pigmy forest, SW foot of Navajo Mountain, Coconino County, Arizona (GC). Adult ♀, August 11, 1936, 5500 feet, oaks in Beaver Creek Canyon at Bernheimer Trail, north foot of Navajo Mountain, San Juan County, Utah (UU). Immature, August 14, 1889, near Grand Falls, Little Colorado River (Merriam 1890:95). Juvenile, August 15, 1936, 4500 feet, cottonwoods, East Gypsum Drainage, Monument Valley, Navajo County, Arizona (UU). Adult ♀, August 21, 1934, 5880 feet, shade trees, Kayenta, Navajo County, Arizona (MNA).

Observations: This species was found along San Juan River, Utah, at Bluff by Rowley, May 8, 1892; where Cottam found it common July 2, 1927. Along Little Colorado River, Merriam (1890:95) took an immature at Grand Falls, August 14, 1889; Streater (USBS) saw one and an old nest some time between April 19 and May 7, 1893; the A.O.U. group (Fuertes Cornell University) found it at Adamana, May 7, 1903; and Nelson (USBS) found it rather common near Winslow in July, 1909. Fisher (1903:36) found it at Keams Canyon July 17 to August 3, 1894. Monson has records at the same place, May 23, 26, 28, June 8, 24 (♀ leaving nest), 29, 30, July 2, 12, 1937, and August 13, 1938.

Phillips saw at least three or four pairs at Tuba City, two or three and two old nests in Moencopi Wash three miles to the west, all in cottonwoods, July 2-9, 1936. Woodbury and Russell found a pair nesting in Shonto Canyon, July 12, 1936; a family out of nest in Pasture Canyon and one at Moenave, July 22-24, 1938, all in cottonwoods. Monson had seven records at Toreva, Polacca, Hotevilla, Oraibi and Hopi Buttes. Of his, 17 records in the Navajo Country, the earliest is May 7 and latest August 27, 1937.

Discussion: Bullock's Oriole is primarily a breeder of the cottonwoods which in the Navajo Country are limited to streamsides or equivalent ditches. It appears to be common on the Little Colorado and San Juan rivers where the cottonwoods occur but is absent from the Colorado River where the cottonwoods are missing. It also occurs in scattered localities throughout the Navajo Country wherever the cottonwoods abound either naturally or in cultivation. It is such an evasive secretive bird that it may have been overlooked many times. Pairs presumably nesting were observed July 2-9 by Phillips and July 12 by Woodbury and Russell. Families out of nest were found July 22-24.

BREWER BLACKBIRD . . . *Euphagus cyanocephalus*

Mainly migrant and winter resident and probably a casual summer resident.

Specimens: Adult ♂, July 6, two miles SW of Tuba City, Arizona (MNA).

Observations: Merriam (1890:95) first found this bird in the Navajo Country, September 22-23, 1889, when he observed several at Moa Ave (Moenave) near the spring and found it common in the rushes of Tanner's Gulch (Pasture Canyon). It was found on the San Juan River, in Utah at Riverview, April 28, 1892, by Rowley, and at Noland's Ranch near 4-corners, November 17-27 of the next year by Loring. Skinner saw birds of this species associated with the Yellowheads at Ganado, September 19-20, and at Chin Lee, September 21, 23, 25, 1916. Wetherill found one killed by a cat at Kayenta, May 15, 1935, another one at the spring in Betatakin, June 21-22, 1935, and a flock of 25 near Tuba City, October 27, 1936. Phillips saw one

at Joseph City on Little Colorado, May 4, 1937, and two or three on Moencopi Wash near Tuba City, July 6, 1936. Monson has 17 records of 574 birds distributed as follows: 5 in October of 152 birds, 3 in December of 110 birds, 1 in January of 120 birds, 2 in February of 130 birds, 3 in March of 48 birds, 4 in May of 12 birds, and 1 in June of 2 birds. These were reported mainly from Moencopi, but also included several other lowland stations.

NEVADA COWBIRD . . . *Molothrus ater artemisiae*

A summer resident.

Specimens: ♂, July 2, 1927, fields near Bluff, San Juan River, Utah (BYU). ♂, July 22, 1937, 3300 feet, streamside thicket, Colorado River near Rock Creek (UU). Adult ♂, about corral in Marsh Pass, July 24, 1936, pigmy conifers; female present (MNA). ♀, July 27, 1933, Goodridge, Utah (MVZ). Adult and juvenile ♀, July 31, 1933, 5800 feet, Kayenta, Arizona (MVZ). August 11, 1938, 3100 feet, one egg from nest of Little Flycatcher, tamarix and willows, near Lee's Ferry, Coconino County, Arizona (UU). Juvenile ♀, August 14, 1936, 5500 feet, taken from sage and rabbit brush two miles west of Kayenta, Navajo County, Arizona. This bird was following a small bunch of cattle (UU).

Observations: Hargrave saw one about the corral at Kayenta, March 23, 1934, and noted one or two at Marsh Pass, July 18 and 24, 1936. Wetherill noted it daily at Kayenta, April 12-22, 1934. Monson (1939:168) reported five at Keams Canyon, June 24, 1937, and two at Jeddito, June 30.

Discussion: This cowbird nowhere appears to be common but seems to be well distributed in small numbers in the lower altitudes. We have no records from the mountains or mesas of 6000 feet or over. The records come mostly from the San Juan and Colorado rivers, Utah and Arizona, Kayenta, Keams Canyon and Jeddito. It is evidently a parasite here as elsewhere, laying its eggs in the nests of other birds that nest within its habitat. One egg was found in the nest of a Little Flycatcher on the Colorado River near Lee's Ferry.

DWARF COWBIRD . . . *Molothrus ater obscurus*

A summer resident.

Specimens: Adult ♂, July 9, 1936, two miles SW of Tuba City, Arizona (MNA Z8.744). Immature, July 22, 1938, 5400 feet, willows and bushes in Pasture Canyon near Tuba City, Arizona (UU 4381).

Observations: Phillips saw a female feeding on the shore of the Tuba City reservoir, July 2; several at the same place July 7, and observed a flock of about 20 which fed regularly at a ranch on Moencopi Wash below Tuba City, July 3-9, 1936. Woodbury and Russell saw one or two birds in Pasture Canyon, July 21, 23, and August 22, 1938.

Discussion: The division between the two subspecies is not clearly defined, and there probably is intergradation in the Navajo Country. Since it is clearly impracticable to separate these subspecies by observations in the field, all of the observation records are assigned to *M. a. artemisiae* except those of the Tuba City region where specimens of *M. a. obscurus* have been taken.

WESTERN TANAGER . . . *Piranga ludoviciana*

A breeder of the mountains and canyon heads and a migrant found at all altitudes.

Specimens: ♂, June 21, 1927, Lukachukai Mountains (Trapier USBS). ♀, June 23, 1927, Wheatfield Creek, Tunicha Mountains (Trapier USBS). ♂, June 27, 1933, Skeleton Mesa, Arizona, 8000 feet (MVZ). Adult ♀, July 13, 1936, 8500 feet, ponderosa pine forest, War God Spring, Navajo Mountain, San Juan County, Utah (UU). Adult ♂, July 21, 1938, 5300 feet, cottonwoods, Pasture Canyon near Tuba City, Coconino County, Arizona (UU). Adult ♂, July 26, 6500 feet, cottonwoods, Navajo Mountain Trading Post, San Juan County, Utah (UU). ♂, July 27, 1937, 3300 feet, streamside trees, Colorado River near Rock Creek (UU). ♂, July 28, 1937, 4500 feet, cottonwoods, Rock Creek, Utah (UU). Adult ♂, August 2, 1934, 6500 feet, oaks, Water Lily Canyon, Tsegi Canyons, Navajo County, Arizona (MNA). ♂, ♀, August 6, 1937, 7000 feet, chaparral, Kaiparowits Plateau, Kane County, Utah (UU). Adult ♀, August 7, 1936, 6000 feet, oaks, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♂, August 12, 1934, head of Dogoszhi Biko, Tsegi Canyons, Navajo County, Arizona (MNA). Immature ♀, September 7, 1938, 6000 feet, matchweed and sweet clover in edge of pigmy conifers, Cedar Ridge, Coconino County, Arizona, on highway 89 (UU).

Observations: Nelson found this tanager in 1909 around the orchards at Tuba City where the birds were damaging the plum and peach crops, August 17-20. Trapier found it in both the Lukachukai and Tunicha mountains June 21-23, 1927. Benson found it at War God Spring on Navajo Mountain, June 14, 1933. Wetherill noted it in Betatakin 33 times between April 27 (unusually early) and September 21, 1934-36. They were much more numerous after August 14 than before. He noted several pairs with young families out of nest as early as July 30, 1936, and as late as September 11, 1935. R.B.-M.V. expeditions (Hargrave, Teall, Russell, Woodbury) noted it 45 times from June 27 to August 17, 1933-38. The June and early July records come from Tsegi Canyon heads and from Navajo Mountain. The earliest record regarded as off the breeding ground is one by Woodbury from Pasture Canyon, July 21, 1938. Thereafter the records are widely distributed. It was found sparingly on the San Juan and Colorado rivers, in the Gypsum Jungle in Monument Valley, Utah-Arizona, in the Tsegi canyons and in Pasture Canyon near Tuba City. Monson has 13 records of 26 birds from May 23 to August 28, 1937-38, from Keams Canyon. Toreva, Defiance Plateau, Roof Butte, Hopi Buttes and Oraibi. Stevenson saw two over Chimopovi 10 miles from Oraibi, July 29, 1934.

Discussion: The Western Tanager is undoubtedly a breeder of the mountains and canyon heads where conifers occur, for it has been found in those habitats all through the breeding season. It is a very seclusive bird, seldom seen but often heard. The brilliant red-headed black-winged yellow male is very conspicuous but somehow generally manages to keep hidden in the thick foliage of his habitat. It has been observed or specimens taken during the breeding season in the yellow pine and spruce-fir forests of Navajo Mountain, and among the oaks and Douglas firs in the heads of some of the Tsegi canyons (Kiet Siel, Bubbling Springs, Betatakin), and perhaps in the pigmy forest of Skeleton Mesa. It is also a migrant, presumably reaching the area in late July going south. While its nesting habitat seems to be above 7500 to 8000 feet, it does not seem to be so restricted in migration and may be found at any altitude in suitable trees or thickets. The earliest date which appears to be definite migration is July 21 and the latest September 21. Its spring migration main movement comes in late May, but Wetherill has an unusually early record of April 27. After the breeding season, it is found in many places including the streamside thickets of the San Juan and Colorado rivers (3100-

3400 feet), the Gypsum Jungle in Monument Valley (4500 feet), Pasture Canyon (5300-5600 feet), several of the Tsegi canyons (6000-8000 feet), the Kaiparowits Plateau (7000 feet), the Navajo Mountain (6000-9000 feet), and other localities. It occupies with seeming impartiality the conifers, the pigmy conifers, the aspens, the oaks, the cottonwoods or the streamside thickets after the breeding season is over.

BLACK-HEADED GROSBEAK. *Hedymeles melanocephalus melanocephalus*

A summer resident of the oaks and higher altitude streamside thickets and more sparingly in adjacent spruce-fir forests above and pigmy forests below: also a migrant through the area in almost any wooded habitat as low as 3400 feet.

Specimens: Adult ♀, July 16, 1934, 6900 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♂, July 16, 1938, 7200 feet, oaks, Black Mesa near Coal Mine, Navajo County, Arizona (UU). Adult ♀, July 28, 1935, 6500 feet, oaks, Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC). Adult ♀, July 30, 1938, 3400 feet, willows on bar 35 miles up San Juan River, San Juan County, Utah (UU). Juvenile ♂, August 4, 1936, 6500 feet, willows, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). Adult ♂, August 15, 1935, 10,300 feet, spruce-fir forest, top of Navajo Mountain, San Juan County, Utah (GC).

Observations: Wetherill noted this grosbeak in Betatakin Canyon 12 times, May 8 to September 22, 1934-36. These included five records between May 22 and June 15 which may be regarded as indications of breeding in the canyon. Hargrave has seven records in Kiet Siel, Long and Water Lily Canyons, June 17-July 6, 1933-35, which also may indicate breeding. He recorded that he found birds in both juniper trees and deciduous thickets, June 17, 18, 1933, and that he saw a family moving about in Water Lily Canyon, July 17-19, 1936. Russell saw single birds on Navajo Mountain in the pine-oak belt on eight days between July 3 and 23 and in the spruce-fir forest July 7 and 17, 1936. He also saw one at Marsh Pass, June 27, 1938, two in Bubbling Springs Canyon June 30, 1935, and one July 2, 1935, and one on Black Mesa, July 16, 1938, all of which were probably in or near breeding range. He saw a female feeding two bob-tailed young just barely able to fly, July 15, 1936, in Water Lily Canyon. Monson has June records of singles or pairs at Keams Canyon, Bahlakai Mesa, and Roof Butte, June 4, 14, 16 and 24, 1937, which probably indicates breeding. Phillips saw a male in cottonwoods in Moencopi Wash near Tuba City July 6, 1936, which he regarded as a fall wanderer even though it was still well within its breeding season but out of its probable breeding range. Other observers (Teall, Russell, Woodbury) have post-breeding records July 23 to August 15, 1934-38 from Pasture Canyon, Navajo Mountain Trading Post, Beaver Creek Canyon, Lee's Ferry on Colorado River, and several of the Tsegi canyons. Monson has additional records from Polacca, May 14, and Hopi Buttes, August 26, 1937.

Discussion: This bird is a breeder of canyon heads and mountains mainly below the spruce-fir and pine forests, among the oaks mostly above the pigmy conifers but may descend the streamside fringes to lower altitudes. It has been observed during the breeding season among the oaks and junipers in many of the Tsegi Canyons (Kiet Siel, Water Lily, Long, Bubbling Springs, Betatakin), and among the pine and spruce-fir forests on Navajo Mountain. It probably spreads out considerably after the breeding season, but the local popu-

lation may be augmented by migrants arriving after mid-July. While the bird still occurs in the same areas as earlier, it is also found elsewhere. A much-worn female was taken among the streamside thickets of the San Juan River 3400 feet, on July 30, where it may have been breeding. There is no indication of flocking except families still being tended by parents. The bird probably arrives from the south in early May, has young in the nest by June 20, young out of the nest by mid-July, and leaves in September. Evidently the males help with the incubation for Hargrave has a record of a male on a nest containing young, June 20, 1934. Extreme dates are May 8 and September 22.

WESTERN BLUE GROSBEAK . . . *Guiraca caerulea interfusa*

A breeder of the streamside thickets of the Colorado River and Tuba City region, perhaps elsewhere.

Specimens: Adult ♀, July 3, 1936, farmlands one mile south of Tuba City, Arizona (MNA). Adult ♀, July 17, 1936, willow thicket, 3100 feet. Ferry swale above Lee's Ferry, Coconino County, Arizona (UU). Immature ♀, July 23, 1938, 5400 feet, squawbush, Pasture Canyon near Tuba City, Coconino County, Arizona (UU). Adult ♂, ♀ and juvenile, August 9, 10, 1938, 3140 feet, tamarix and willows on bar 13 miles above Lee's Ferry on Colorado River, Coconino County, Arizona (UU). Nest and nestling, August 11, 1938, 3100 feet, six feet up in tamarix among willows, near Lee's Ferry, Coconino County, Arizona (UU).

Observations: Phillips found two pairs in vicinity of orchards in Moencopi Wash and a male in upper Pasture Canyon, all near Tuba City, July 2-9, 1936. Woodbury and Russell found it in Pasture Canyon, July 22-23, 1938, and found it along the banks of Colorado River, Arizona, at Lee's Ferry, August 10-11, 1938 (14 birds, a nest and 2 nestlings), and on a bar 13 miles upstream, August 9-10, where they found two pairs with young out of nest.

Distribution: This bird was found breeding in both 1936 and 1938 among the willow and tamarix fringes of the lower Colorado River near Lee's Ferry, both above and below. It has also been found in both 1936 and 1938 in the Tuba City vicinity, in upper Pasture Canyon and along the farms in the Moencopi Wash. On August 10, 1938, a careful census of birds was made on a bar 13 miles above Lee's Ferry on the Colorado River, Arizona. The bar, similar to Fig 3, was about one-half mile long, skirted on one side by the river and on the other side by a cliff. It was about 50 yards wide somewhat below the middle but tapered to nothing at both ends. It was fringed on the river side by willows 4 to 6 feet high at the upper end, but increased to 8 or 10 feet high at the lower end where there was considerable intermixture of tamarix. Behind the fringe were *Baccharis* and greasewood bushes. This bar contained what we believed were two families of blue grosbeaks. We saw two adult males, two adult females and at least three fledglings just out of the nest but in slightly different stages of feathering, indicating two broods. At the mouth of Paria Creek just below Lee's Ferry on August 10 and 11, 1938, we counted 14 birds, mostly adult, and found a nest containing two nearly naked nestlings estimated to be two or three days old. The down was very scanty and the feather buds were beginning to show. The nest was six feet up in a tamarix in a dense thicket of willows, and was constructed of fresh tamarix twigs lined with reddish-brown roots. The cup of the nest was 2 inches deep and $2\frac{1}{4}$ inches in diameter. The bird seems to

be attracted primarily to the streamside thickets of willows and brush and is mainly limited to those at low altitudes with hot summers, but extends upward at least to 5500 feet in Pasture Canyon.

LAZULI BUNTING . . . *Passerina amoena*

A migrant, possibly a breeder on the San Juan and Colorado rivers and at Keams Canyon.

Specimens: ♂, July 2, 1927, common in cottonwoods near Bluff on San Juan River, Utah (CC). ♂, July 20, 1937, 3300 feet, streamside thicket, Colorado River near Rock Creek (UU). Adult ♀, August 2, 1934, 6750 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♂, August 13, 1935, 9000 feet, shrubbery among aspen and ponderosa pines, War God Springs, Navajo Mountain, San Juan County, Utah (GC).

Observations: Nelson observed "a few" immatures at Lee's Ferry, August 23-26, 1909. Cottam found it "common" in the streamside thickets among the cottonwoods along the San Juan River near Bluff, Utah, July 2, 1927. Woodbury found it singly in streamside bushes of the Colorado River, 56 miles above Lee's Ferry near mouth of Rock Creek, Kane County, Utah, July 20, 1937. Monson observed it at Keams Canyon, Arizona, May 15, June 30, and August 28, 1937, indicating the possibility that it may be a sparse breeder there. He also saw two at Oraibi, August 24, 1938. Hargrave saw one in Water Lily Canyon, August 2, 1934. Russell recorded it as fairly common on lower Navajo Mountain, August 10-16, 1936, and reported one at Kayenta Reservoir, August 19, 1938.

Discussion: Extreme dates available are May 15 and August 28. It is presumably mainly a migrant, but the possibility of breeding is indicated at least near Bluff and Keams Canyon, perhaps along Colorado River. The records of August 2-28 probably indicate migration.

WESTERN EVENING GROSBEAK . . . *Hesperiphona vespertina brooksi*

A flock of 14, including two males, was seen at Kiet Siel Pueblo, in the Tsegi Canyon, March 15, 1934 (MAW).

CASSIN PURPLE FINCH . . . *Carpodacus cassinii*

Probably a sparse breeder on Navajo Mountain and a winter visitant in some of the canyons.

Specimens: Adult ♂, ♀ and immature ♂, January 24, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). Juvenile ♂, adult ♀, August 9, 14, 1935, 9000 feet, pine forest, southwest side of Navajo Mountain, San Juan County, Utah (GC).

Observations: January 24, 1934, three taken from flock of about 15, Kiet Siel Canyon (LH). February 10, 1938, St. Michaels, flock of 26 (GM). March 25, 1934, Kiet Siel Canyon, two in speckled plumage seen feeding with large flock of juncos (LH). August 31, 1909, "rather common in Transition Zone" on mountains 15 miles northwest of Fort Defiance (E. W. Nelson). October 26, 1937, one at Roof Butte (GM).

Distribution: The purple finch is sparsely distributed in the summer through the yellow pines, possibly higher, on Navajo Mountain, Defiance Plateau and probably in the Lukachukai Mountains. It was never very common nor conspicuous. The immature specimen taken on August 9, 1935,

seems to indicate that it had been breeding there. It probably winters in small numbers in the canyons.

COMMON HOUSE FINCH . . . *Carpodacus mexicanus frontalis*

A permanent resident of pigmy conifers and deserts.

Specimens: Adult ♂ and ♀, March 4, 1938, 5680 feet, Kayenta, Navajo County, Arizona (MNA). Adult ♂ and three ♀, March 5, 1938, Kayenta, 5860 feet, Navajo County, Arizona, poisoned, with English Sparrows (MNA). Three ♂, ♀, April 19-21, 1892, Noland's Ranch near 4-corners, Utah. ♂, April 28, 1892, Riverview on San Juan River, Utah (AMNH). Adult ♂ and ♀, April 28-29, 1935, near Bluff, Utah (UU). ♂, May 5, 1892, Bluff, Utah (AMNH). Juvenile, July 3, 1937, 4500 feet, cottonwoods, Monument Valley, Utah-Arizona (UU). Juvenile, July 3, 1937, 4500 feet, cottonwoods, Monument Valley, Utah-Arizona (UU). Adult ♂, July 8, 1935, 6600 feet, pigmy forest, Bubbling Springs Canyon, Tsegi Draniage, Navajo County, Arizona (GC). ♀, juvenile ♀, July 8, 1937, 4500 feet, cliffs and brush, Gypsum Wash, Monument Valley, Utah (UU). Immature ♂, July 12, 1936, 3200 feet, willows, Colorado River in side canyon, San Juan County, Utah (UU). ♂, July 13, 1937, 4500 feet, cottonwoods, Oliato, Utah (UU). - ♂, July 23, 1937, 4500 feet, streamside trees, Colorado River near Rock Creek (UU). Adult ♂, June 21, 1934, 6700 feet, Water Lily Canyon, Navajo County, Arizona (MNA). Freshly made nest, unused, July 25, 1938, 6300 feet, pigmy forest, Marsh Pass Camp, Navajo County, Arizona (UU). Adult ♂, July 26, 1936, 6500 feet, cottonwoods, Navajo Mountain Trading Post, San Juan County, Utah (UU). ♀, and juvenile, July 26, 1937, 3300 feet, streamside trees, Colorado River near Rock Creek (UU). These specimens appear to be intergrades with *C. m. solitudinus*, but probably nearer *frontalis*.

Observations: There are so many observations, they cannot all be cited. Both Rowley (AMNH) and Loring (USBS) found it on the San Juan River in 1892-3 at Bluff, Riverview and Noland's Ranch. An expedition from the University of Utah found it at Bluff, April 28-29, 1935. Wetherill has many records from Betatakin, Kiet Siel, Tsegi and Kayenta distributed through much of the year. Phillips has records from the Tuba City region July 2-9, 1936. R.B.-M.V. expeditions (Hargrave, Lyons, Russell, Woodbury) have more than 100 records, June 8 to September 7, 1933-8. These come from many localities including the San Juan and Colorado rivers and many of the valleys, foothills and mesas of low altitudes but not from high mountains. Monson has 146 records well distributed through the entire year and over the lowland areas of the entire Navajo Country. They were seldom alone often in flocks sometimes including dozens or hundreds of individuals (120, 230).

Discussion: The house finch is a permanent resident of the Navajo Country and is one of the most ubiquitous birds there. It occupies at least two of the largest and more widespread habitats—the desert and the pigmy conifers. We have no records from Navajo Mountain or other high altitudes, and believe it mainly restricted below 6500 or 7000 feet. It is well distributed over the entire area below this altitude. It is a common bird along the streamside bars and vegetation along the San Juan and Colorado Rivers (3100-3500 feet), all through Monument Valley (4000-5000 feet), Kayenta Valley, Marsh Pass, Tsegi Canyons, Kletthla Valley, Tuba City region, Navajo Mountain Trading Post (6500 feet), Shonto Canyon, Hopi villages, Little Colorado River, and many other places.

Although widely distributed through the desert, the bird seems to require water to drink. Presumably the liquid obtained in food is not sufficient to supply its needs and the diet is supplemented by going to springs and water-holes. It was observed in Monument Valley, July 4, 1937, coming in to water at Gypsum Jungle in small flocks from time to time during the day. After the young are out of nest, this sometimes results in concentrated populations around the watering places.

Although a very common bird, it is wary and shy and we have but few intimate observations of habits or behavior. Out of the hundred recorded observations, valuable for distribution studies, there are but few that give a clue to behavior or reproductive activities. Woodbury's record of birds coming in to water at Gypsum Jungle on July 4, 1937, describes a great concentration of finches, in which there were many small groups that appeared to be family flocks in which the young ones followed the parents, importuning for food by the characteristic wing quivering behavior.

On July 4 and 5, 1938, families were noted a few miles from Marsh Pass in which the young were out of nest. Russell reports birds last seen at the nest July 11, 1935. These observations indicate that the first or possibly the second brood is out of the nest by early July, perhaps earlier. An observation at Marsh Pass on July 5, 1938, indicates what is believed to have been the beginning of second brood activities. At 8 a.m. a pair of finches was observed carrying nesting material to a prospective nest site ten feet up in the top of a juniper tree near camp. By evening the foundation of weeds had been laid. The next morning, July 6, the pair was observed working on the nest. The female flew from the nest to a dead juniper nearby where she pulled shreds of bark one after another until she got a mouthful which she carried back to the nest. The male perched on the outer limbs of the tree while the female was inside working on the nest. By noon a superstructure of juniper bark had been woven above the weed base. By evening the nest had been lined with wool and the nest appeared to be complete. The cup in the nest measured $1\frac{3}{4}$ inches deep and 3 1-3 inches in diameter. The nest, however, was never used, and it was later taken for a specimen.

NORTHERN PINE SISKIN . . . *Spinus pinus pinus*

Probably a breeder of the spruce-fir forest on Navajo Mountain, perhaps elsewhere, and probably a sparse winter resident of the lowlands.

Observations: Hargrave saw two feeding in pigmy forest in Kiet Siel Canyon, March 25, 1934. Benson lost a specimen believed to be of this species in an inaccessible place near War God Spring on Navajo Mountain, Utah, June 19, 1933. Russell saw from one to four birds almost daily July 13-21, 1936, on Navajo Mountain chiefly in the spruce-fir forest either alone, with goldfinches or with crossbills. Monson has 18 records, of which three are in January, one in February, five in May, one in June, seven in October, and one in November. Numbers observed ranged from one to four, except in October when they ranged from 7 to 83. The records are well distributed through the central portion of the Navajo Country from Moenave nearly to New Mexico.

PALE GOLDFINCH . . . *Spinus tristis pallidus*

Probably migrant.

Observations: March 25, 1934, Kiet Siel Canyon, two believed of this species stopped for only a few minutes. Later, flock of about 40 seen (LH).

May 28, June 4, 1937, Keams Canyon, three and two seen (Monson 1939: 168). November 8-15, 1893, common in weeds and gardens and along river banks near Bluff, Utah (J. A. Loring).

GREEN-BACKED GOLDFINCH . . . *Spinus psaltria hesperophilus*

A sparse but widely distributed summer resident and a more numerous winter resident.

Specimens: Adult ♀, June 23, 1934, 6850 feet, oaks, Water Lily Canyon, Navajo County, Arizona (MNA). Immature, July 2, 1936, cottonwoods, three miles west of Tuba City, Coconino County, Arizona (MNA). Adult ♂, July 17, 1938, 6300 feet, beewees and pigmy forest, Marsh Pass, Navajo County, Arizona (UU).

Observations: Jenks saw several birds at a little natural bridge five miles southwest of Fort Defiance, June 22, 1944. Wetherill noted it in Betatakin Canyon on eight different days between April 26 and May 13, 1935. He also saw a flock of 30 in Kiet Siel Canyon, May 4, 1936. Phillips saw several at intervals on Moencopi Wash below Tuba City, July 2-9, 1936. Hargrave saw several in Water Lily Canyon, June 23-24, 1934, and Teall saw one in Dogoszhi Biko, August 11 of the same year. Russell saw what appeared to be a family of five, two adults and three young, near War God Spring on Navajo Mountain, July 10, 11, 13, 1936; two or three among the beewees and cottonwoods at Navajo Mountain Trading Post, July 27, 29, 1936; one in Dogoszhi Biko, August 14, 1936; and two in beewees and junipers at Marsh Pass, July 17, 1938. Monson has noted it on 19 different dates from Tuba City region, near Cameron, Keams Canyon, Ganado and Bodaway House. These include 44 birds on five dates in January, 5 on two days in February, 1 in March, 6 on two dates in May, 6 in August, 3 in October and 51 on seven dates in December, 1936-38.

Discussion: This goldfinch must be a sparse breeder in the area for it remains here all through the breeding season. Monson's records indicate that it is more numerous in the winter probably resulting from migratory arrivals. We have no nesting data, but an immature specimen was taken July 2, 1936, below Tuba City and a family containing three out of nest was recognized on Navajo Mountain, July 11-13, 1936. Never abundant anywhere during the breeding season, it is, however, widely distributed, being reported from the Tsegi canyons, Marsh Pass, Navajo Trading Post, Kayenta, Tuba City, Cameron, Keams Canyon, Ganado and Bodaway House. Several small flocks have been reported, numbering up to 30 individuals, mostly in winter and spring. Monson thinks it nests wherever there is any considerable body of cottonwoods and willows available such as at Fort Defiance, Ganado, Winslow, Tuba City or Navajo Mountain.

RED CROSSBILL . . . *Loxia curvirostra*

Six specimens of red crossbills from Navajo Mountain and Black Mesa were determined by Ludlow Griscom as belonging to three different races. What is probably the breeding bird (UU 4447-8) was considered to belong to a great intermountain unnamed complex intermediate between *grinnelli* of the Pacific Coast and *benti* of the north. Three atypical specimens (UU 4445-6, 5665) were considered to be nearer *bendirei* of Wyoming. The sixth specimen (UU 5665) belonged to the Mexican race *stricklandi*. The great amount of wandering by these birds makes their distribution hard to delineate.

Specimens: *L. c. bendirei*—Adult ♂♂, July 16, 1938, 7000 feet, ponderosa pine, Black Mesa near Coal Mine, Navajo County, Arizona (UU 4445-6). Adult ♀, August 13, 1935, 9000 feet, ponderosa pine forest near War God Spring, Navajo Mountain, San Juan County, Utah (UU 5664). *L. c. grinnelli* ± *benti*—Adult ♀♀, July 16, 1938, 7000 feet, ponderosa pine, Black Mesa, five miles northwest of Coal Mine, Navajo County, Arizona (UU 4447-8). *L. c. stricklandi*—Adult ♂, August 12, 1935, ponderosa pine forest near War God Spring, Navajo Mountain, San Juan County, Utah (UU 5665).

Observations: Hargrave saw five fly overhead at Kiet Siel Spring toward Skeleton Mesa, June 26, 1934, and noted birds on the rim at the head of Water Lily Canyon, July 18-19, 1936. Russell saw five stop for a few minutes in the firs at Spruce Spring on the mesa above Bubbling Springs Canyon, July 14, 1935; saw three in the tall conifers in Long Canyon three days later and four the next day. He watched a flock of 30 or 40 birds in the pine and spruce-fir forests on Navajo Mountain many times between July 2 and 23, 1936, and a group of 12 birds were observed there August 13, 1936. On July 16, 1938, Woodbury observed a group of six flying south over Black Mesa toward a grove of ponderosa pine, where Russell saw six and obtained four specimens a few minutes later. Monson saw 18 on Black Mesa not far from the same place December 16, 1936.

Discussion: The birds of this species seem to be such great wanderers that it is difficult to interpret these records. There is probably a breeding race which occurs on Navajo Mountain, in the Tsegi Canyon heads, on Black Mesa and perhaps other places where coniferous forests occur. Their movements are so erratic that it is not safe to predict where breeding occurs. Wanderers from the Mexican races from elsewhere are likely to be mixed with the local birds. Their known tendency to follow seed production among the conifers seems to be substantiated by the data available.

GREEN-TAILED TOWHEE . . . *Oberholseria chlorura*

Probably a breeder north of the Colorado River and a migrant south of the river.

Specimens: Adult ♀♂, April 29, 1935, and May 11, 1933, near Bluff, Utah (UU). Adult ♂ and ♀, and juvenile, August 3, 12, 1937, 7000 feet, in serviceberry bushes, Kaiparowits Plateau, Utah (UU).

Observations: University of Utah expeditions found this Towhee near Bluff in the brush along the San Juan River, Utah, May 11, 1933, and April 29, 1935. Woodbury and Kiss found it several times among the serviceberry bushes and oaks in canyon heads on Kaiparowits Plateau in late July and early August, 1913, where they thought it had been breeding. Wetherill noted it in Betatakin Canyon, August 22, 1936, almost daily, September 9-17, September 11-16, October 2-8, 1934, and October 11-13, 1935. Russell noted one in Pasture Canyon, September 7, 1938. Monson observed single birds at Keams Canyon, May 8 and August 28, 1937, and at Ganado, September 29, 1938.

Discussion: It seems to be a rare bird in the part of our area south of the Colorado River where it is known only in migration. The Bluff records of April 29 and May 11 indicate spring migration. Fall migration apparently extends from late August to mid-October (extreme dates August 22-

October 13). It is probably a breeder on the Kaiparowits Plateau, perhaps elsewhere, north of the Colorado River.

SPURRED TOWHEE . . . *Pipilo maculatus montanus*

A permanent resident of the chaparral; a breeder, common migrant and sparse winter resident.

Specimens: Adult ♂, June 24, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). Adult ♀, June 21, 1934, 6700 feet, Water Lily Canyon, Navajo County, Arizona (MNA). ♀, June 26, 1933, 8000 feet, Skeleton Mesa, Arizona (MVZ). Adult ♀, July 3, 1936, 8500 feet, manzanita; near War God Spring, Navajo Mountain, San Juan County, Utah (UU). Adult ♂, July 11, 1938, 7500 feet, pigmy forest, Black Mesa near Coal Mine, Navajo County, Arizona (UU). Immature ♂, July 19, 1936, salt brush and greasewood, Dogoszhi Biko, opposite mouth of Water Lily Canyon (MNA). Immature ♀, July 22, 1933, Segi-ot-sosie Canyon, Arizona (MVZ). Adult ♂, July 22, 1936, mixed zones, head of Dogoszhi Biko, Tsegi Canyon, Navajo County, Arizona (MNA). Adult ♀, July 25, 1935, 6900 feet, willow thickets, near ruins in Kiet Siel Canyon, Tsegi drainage, Navajo County, Arizona (UU). Juvenile ♂, July 28, 1935, 6400 feet, oaks, Long Canyon, Tsegi drainage, Navajo County, Arizona (UU). Adult ♂, July 29, 1936, deciduous trees in mixed Transition and Canadian Zones, Water Lily Canyon, Navajo County, Arizona (MNA). ♂, ♀ ♀, July 30, 31, 1937, 700 feet, chaparral, Kaiparowits Plateau, Kane County, Utah (UU). Juveniles, August 2, 10, 1937, 7000 feet, chaparral, Kaiparowits Plateau, Kane County, Utah: a very common bird of the brushy thickets (UU). Adult ♀, August 7, 1936, 6000 feet, willows and aspens, Beaver Creek Canyon, north foot of Navajo Mountain, San Juan County, Utah (UU). ♂ (molting from juvenile to adult plumage), August 11, 1935, 8500 feet, manzanita thickets in ponderosa pine forest, Navajo Mountain, San Juan County, Utah (UU).

Observations: Merriam (1890:97) reported this towhee common in the bushes along Little Colorado River, August 12, 19, and September 20, 27, 1889, and also found it at Echo Cliffs near Moa Ave (Moenave), September 21 or 22. Loring (USBS) found it common around Bluff, Utah, on the San Juan River, November 8-15, 1893. Benson (1935:445) found birds in the thickets among the ponderosa pines on Navajo Mountain, June 13, 14, 17, 1933. Boyers took specimens on Skeleton Mesa and in Tsegi-ot-sosie Canyon, June 26 and July 22, 1933. Wetherill noted one to several almost daily in Betatakin Canyon, March 29, May 1-2, 8, 26, July 11, 31, August 2, 10, 20, 27, 29-30, September 1, 8-11, 16, 19-23, 29-30, October 1-14, 21-26, 1934-36. The fall concentrations probably indicate migration. Woodbury found it to be a very common bird of the brushy thickets on Kaiparowits Plateau (7000 feet) during late July and early August about the time young were leaving nests. Monson saw two to four birds on Bahlakai Mesa, June 15, 29, 30, 1937. There are many records of R.B.-M.V. expedition members from the Tsegi canyons, Black Mesa, Navajo Mountain, Beaver Creek Canyon and other similar places. Most of them come from bushy thickets such as oaks, serviceberry and manzanita. Hargrave found it abundant in Kiet Siel Canyon where he counted 40 in about 300 yards, March 25, 1934.

Discussion: The spurred towhee is primarily a bird of the shrub belt where there are thick bushes for cover and a thick mat of dead leaves in which to scratch. It is a perching bird adapted to earn a living by scratching. Such

habitats are mostly limited to the Transition Zone and the bird is mostly found between 6000 and 8500 feet. The principal records come from Kaiparowits Plateau and Navajo Mountain, Utah; the Tsegi canyons, Skeleton and Black Mesa, Arizona. These places include the majority of the shrub habitats in the area. A record of June 15, 1936, indicates that young were out of the nest on that date, but another record of June 21, 1934, indicates parents feeding young in the nest. Probably the first broods emerge in June, mostly in the latter half. A young one just out of nest and learning to fly on August 8, 1936, probably represents a second brood. The bird is probably a permanent resident even though we have no records between October 26 and January 24. Over 50 records attest its distribution through the balance of the year.

LARK BUNTING . . . *Calamospiza melanocorys*

Observations: Streater (USBS) saw a ♂ at Winslow, May 6, 1893. Monson (1939:168) reported a ♂ seen on Wildcat Mesa, ten miles northwest of Keams Canyon, Arizona, May 13, 1937.

SAVANNAH SPARROW . . . *Passerculus sandwichensis nevadensis*

A sparse breeder of the short grasses near the ponds and reservoirs: a more common migrant and a sparse winter resident.

Specimens: Adult ♂, March 23, 1934, 5900 feet, Kayenta, Navajo County, Arizona (MNA). Adult ♂, July 14, 1938, 5500 feet, near Kayenta Reservoir, Navajo County, Arizona (UU). Adult ♀, August 19, 1938, 5300 feet, grass and cockleburs near Kayenta Reservoir, Navajo County, Arizona (UU).

Observations: Merriam (1890:95) found it in the Echo Cliffs near Moenave, September 21 or 22, 1889, presumably near springs. Hargrave noted that it was common at Kayenta Reservoir, March 23, 1934. Woodbury and Russell found it at Kayenta Reservoir, apparently breeding either in or near the rushes there, July 13-14, 1938, and perhaps a lingering family there, August 19. They also found it at Pasture Canyon, probably transients or migrants, August 22 and September 6-7, 1938. They did not find it there July 21-24 and so presume that it probably does not breed there. Monson has six records of one or two each from Ganado, February 10, 1938, Red Lake north of Fort Defiance, February 23, 1938, Kayenta, April 9, 1937, and Snake Butte southwest of Polacca, September 30 and October 13, 1938.

Comments: This bird has been reported only from the vicinity of ponds or reservoirs near Kayenta, Tuba City, and elsewhere. Although we have no data on its breeding, we believe it to be a sparse breeding bird, very definitely limited in its distribution to the small spots where short grasses and weeds occur near the ponds and reservoirs. We also believe it to be a sparse winter resident and a migrant causing an increase in the population during late August and September. Where two birds were seen on August 22, 1938, in lower Pasture Canyon, ten were seen on September 7.

WESTERN VESPER SPARROW . . . *Pooecetes gramineus confinis*

Sparse breeder and migrant.

Specimens: ♂, June 26, 1927, Whiskey Creek. Tunicha Mountains, 6500 feet (Trapier, USBS). July 2, 1927, Bluff on San Juan River, 4300

feet (BYU). Adult ♂, July 8, 1938, 6700 feet, carrying food, sagebrush flats, near Little Man's Lake, Klethla Valley, Navajo County, Arizona (UU). Adult ♀, August 21, 1938, 6600 feet, sagebrush flats, near Little Man's Lake Klethla Valley, Navajo County, Arizona (UU).

Observations: Merriam (1890:95) reported several along Moencopi Wash near Moencopi village about September 23, 1889. Monson has 33 records of 99 birds extending between March 19 and September 30, 1936-38. Of these, 21 are records of single birds, 11 are records of two to nine, and one is a record of 37 on July 14, 1938, at Steamboat. These records are from localities well distributed over the Navajo Country, but are mainly from lowlands or intermediate levels and none of them from high altitudes of the mountains.

Comment: It is believed to be a breeder because of the adult male carrying food and the seasonal distribution of Monson's records which are distributed much as would be expected of a breeder and migrant; five records of eight birds in March, seven of eight in April, two of two in May, five of ten in June, seven of 61 in July, three of three in August and four of seven in September.

WESTERN LARK SPARROW . . . *Chondestes grammacus strigatus*

A summer resident mainly of the pigmy forest edges and openings, staying from April to October.

Specimens: ♂, April 28, 1892, Riverview on San Juan River, Utah (AMNH). Skin, April 29, 1935, near Bluff, Utah (UU). Specimen, mid-May, 1858, Fort Defiance (Baird 1861:6). ♀, July 2, 1927, common around Bluff, Utah (BYU). Adult ♀, July 2, 1938, 6200 feet, greasewood flats, four miles SW of Marsh Pass, Navajo County, Arizona (UU). Juvenile ♀, July 4, 1938, 6300 feet, greasewood flats, five miles SW of Marsh Pass, Navajo County, Arizona (UU). Immature ♀, from family, July 12, 1936, in brush four miles up Tsegi Canyon from Marsh Pass (MNA). Adult ♀, July 26, 1936, 6500 feet, sagebrush, Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult ♂, July 28, 1935, 6500 feet, rabbit brush flats, Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC). August 4, 1937, 7000 feet, sagebrush, Kaiparowits Plateau, Kane County, Utah (UU).

Observations: Streator found it at Winslow and Holbrook, April 19-May 7, 1893. Fisher (1903:36) observed it at Keams Canyon, July 17-21, 1894. Skinner saw two at Adamana, October 8, 1916. Cottam found it common around Bluff, July 2, 1927. Jenks reported it from St. Michaels and on road to Querino Canyon, June 20, 21, 1933. Wetherill noted it in Tsegi Canyon branches (Betatakin, Kiet Siel), May 8, July 15, August 19, 21, 24, 28-31, September 12, 15, October 1, 8, 1934-36. The R.B.-M.V. expeditions collectors (Hargrave Russell, Woodbury, et al) have no June records but have records of hundreds of birds on 24 different dates from July 3 to September 7, 1934-38. Presumably this sparrow nests in or near the Tsegi canyons, for Hargrave and Teall found many birds in wide canyon bottoms from July 11 onward. On July 12, 1936, Hargrave estimated that 50 birds in family groups were seen in one mile up the main Tsegi Canyon. It probably also nests in the flats from Kayenta via Marsh Pass toward Cow Springs, and Russell and Woodbury reported 30-40 pairs of birds in one flat three to five miles southwest of Marsh Pass, July 3-4, 1938. There are several other records in the same region. Young were first observed out of nest, July 5, 1938, but

adult pairs without young were observed until mid-July. By August 14, 1936, Russell reported hundreds of birds scattered over the rabbit brush flats west of Kayenta, often in flocks of 30. Monson has 35 records of 78 birds from May 6 to September 14, 1937-38. Of these, 12 records of 17 were in May, 9 of 14 in June, 6 of 12 in July, 7 of 27 in August and one record of eight birds in September. The June records which probably indicate breeding occur at Keams Canyon, Bahlakai Mesa, Jeddito, Steamboat, Marsh Pass, and Red Lake north of Fort Defiance.

Discussion: The Lark Sparrow probably breeds in open flats with medium dense brush and often in savannah at the pigmy conifer edges or openings. After the broods emerge, they seem to wander a great deal and appear in flats, pigmy forest openings and canyon bottoms where they do not breed. After July 5-15 they are often found in family flocks of five to seven and during August sometimes aggregate into larger flocks up to thirty. The bulk appear to arrive in the area in early May and depart in late August, but extreme available dates are April 28 and September 14. It has been found on the Colorado River at mouth of San Juan (3250 feet) and on Kaiparowits Plateau (7000 feet).

SCOTT SPARROW . . . *Aimophila ruficeps scotti*
(Hypothetical)

Merriam (1890:97) reported finding this bird (*Pucaea ruficeps boucardi*) on the desert of the Little Colorado. He was there August 12-19 and September 20 and 27, 1889.

DESERT SPARROW . . . *Amphispiza bilineata deserticola*

A breeder of the open desert brush from the lower part of pigmy forest downward, mostly associated with black brush (*Coleogyne*).

Specimens: Adult skin, April 29, 1935, near Bluff, Utah (UU). Juvenile ♂, July 2, 1936, Kerley Trading Post, 1½ miles southwest of Tuba City, Navajo County, Arizona (MNA). ♀, July 2, 1927, in brush west of Bluff, Utah (BYU). ♀, skeletons, July 3, 1937, 4500 feet, desert brush, Monument Valley, Arizona (UU). ♂♂, July 3, 6, 1937, 4500 feet, desert brush, Monument Valley, Arizona (UU). Juvenile ♂, July 3, 1938, 6200 feet, greasewood flats, near Marsh Pass, Navajo County, Arizona (UU). ♀, July 4, 1927, brush in Monument Valley, Utah (BYU). Juvenile, July 8, 1937, 4500 feet, desert brush, garnet ridge, six miles SW of Mexican Hat, San Juan County, Utah (UU). Juvenile, July 9, 1938, 5500 feet, greasewood flats, near Kayenta, Navajo County, Arizona (UU). ♂♂, July 12, 13, 1937, 4500 feet, desert brush, Oljato, Utah (UU). Nest and eggs, July 14, 1937, 4500 feet, desert brush, Oljato, Utah: this probably represents a second brood; a very common bird of the black brush, *Coleogyne*, (UU). ♂, July 15, 1909, two miles east of Winslow (Birdseye, USBS). Adult ♂, July 16, 1933, Kayenta, Arizona (MNA). ♂ and juvenile, July 21, 1937, 2200 feet, desert brush, Colorado River near Rock Creek, Kane County, Utah (UU). Adult ♀, July 27, 1936, 6500 feet, sagebrush, one mile north of Navajo Mountain Trading Post, San Juan County, Utah (UU). Adult and immature, July 29, 1934, sagebrush on mesa at Chimopovi (Stevenson). Adult ♂, July 30, 1935, 6000 feet, brush in Tsegi Canyon, four miles above Marsh Pass, Navajo County, Arizona (GC). Juvenile, August 1, 1935, 5900 feet, flats in lowest side canyon of Tsegi drainage, Navajo County, Arizona (GC). Juvenile ♂, August 6, 1935, 5800 feet, sagebrush flats, southwest foot of Navajo Mountain Coconino County, Arizona (GC).

Observations: Merriam (1890:96) found this denizen of the desert "tolerably common" on the desert of the Little Colorado, August 12-19, 1889, but did not report it on a later trip, September 20-27. Streater found it "rather common" at Holbrook, April 19 to May 7, 1893. Fisher (1903:36) observed it around Keams Canyon, July 17 to August 3, 1894. Birdseye (USBS) found it on the flats two miles east of Winslow, Arizona, July 15, 1909. He and Nelson on the same trip found it quite generally distributed across the Navajo Country and reported a nest containing downy young eight feet up in a hackberry near White House Ruin in Canyon de Chelly, August 4, 1909. Cottam found it in desert brush west of Bluff, July 2, and in Monument Valley, Utah, July 4, 1927. Jenks and Phillips observed it along Highway 89 between Marble Canyon Bridge and Cameron, August 2, 1933. Phillips found it all around Tuba City in desert brush but not in cultivated areas, July 2-9, 1936. Wetherill found it unusually common around Kayenta, September 1, 1940, and reported 20 birds near the Kayenta Reservoir presumably wintering there, November 29-30, 1941. The R.B.-M.V. expeditions produced many records. Hargrave and Russell have seven records in open flats in Tsegi canyons between June 13 and August 9, 1934-36. Woodbury found it well distributed over the desert areas of Monument Valley (Utah and Arizona), Oljato, and along the San Juan and Colorado rivers back behind but not in the streamside fringes, July 3-26, 1937. Woodbury and Russell found it commonly distributed all through the low desert flats from Monument Valley, Kayenta flats, Marsh Pass, Kletthla Valley, Tuba region, the flats toward Cameron, U. S. Highway 89 and open areas along the San Juan and Colorado rivers. Monson has 63 records of 217 birds from the desert flats and lowlands well distributed over the Navajo Country from April 12 to August 24, 1937-38. These are distributed as follows: 12 records of 52 individuals in April, 26 of 83 in May, 7 of 15 in June, 11 of 26 in July and 9 of 41 in August.

Discussion: This sparrow appears to be a summer breeder that arrives about mid-April and leaves in late August. Extreme dates available are April 12 and September 1, except for the one record of 20 birds near Kayenta, November 29-30, which if true may indicate some stragglers wintering there. This bird is a denizen of the open desert, seeming to be closely associated with the distribution of the black brush (*Coleogyne*). The black brush overlaps the lower edge of the pigmy conifers and extends downward into lower altitudes, especially the foothills and valley edges free from alkali. Here the Desert Sparrow seems at home, but also occupies other types of desert brush. Its upper limit is about 6000 or 6500 feet, but is mostly found below 5500 feet. It seems well distributed over the entire Navajo country at low altitudes. Russell observed many full-grown young birds out of nest around Moencopie Wash, Marsh Pass and Laguna Creek, June 24-27, 1938. Woodbury found many young broods out of nest in Monument Valley, Utah and Arizona, July 2-10, 1937, and he found a nest with two eggs near Oljato, July 14, 1937, which presumably represents a second brood. Nelson's nest with downy young, August 4, 1909, seems to indicate a second or possibly a third brood.

NORTHERN SAGE SPARROW . . . *Amphispiza nevadensis nevadensis*

A breeding bird of the sagebrush flats, and a more abundant winter resident.

Specimens: Specimen, December 15, 1853, Little Colorado River, five miles northwest of Winslow (K and M). Adult ♀, January 20, 1934, 5600 feet, Tonalea (Red Lake), Coconino County, Arizona (MNA). Adult ♂.

July 8, 1938, 6600 feet, sagebrush flats, near Little Man's Lake, Navajo County, Utah (UU). Juvenile ♂, July 15, 1936, 3100 feet, willows along the stream, Warm Creek, Kane County, Utah (UU). Adult ♂, July 30, 1936, 6500 feet, sagebrush, five miles south of Navajo Mountain Trading Post, Coconino County, Arizona (UU).

Observations: Merriam (1890:96) reported seeing it along the desert of Little Colorado, August 12-19, 1889. Streater (USBS) reported a "few seen at Holbrook" April 19 to May 7, 1893. Benson (1935:443) observed it on the flats five miles south of Navajo Mountain, June 12 and 27, 1933. Wetherill observed eight or ten in Kiet Siel Canyon, January 5-6, 1936, and ten near Kayenta Reservoir, November 29-30, 1941. Russell found this to be the commonest bird of the open sage flats south of Navajo Mountain; at least 100 were seen in a single day, adult birds predominating, July 29-31, 1936. Russell and Woodbury found two families of well grown young attended by adults on the flats near Little Man's Lake, ten miles southwest of Marsh Pass, July 8, 1938, where it was observed again August 21. Monson has 69 records of 464 birds mostly between June and February, inclusive, but they are mainly concentrated in December and January. They are distributed as follows: 1 in April, 8 records of 20 birds in June, 6 of 28 in July, 4 of 8 in August, 3 of 8 in September, 5 of 21 in October, 2 of 4 in November, 12 of 150 in December, 22 of 176 in January and 6 of 48 in February.

Discussion: The distribution of Monson's records suggests that the bird is much more numerous in winter than in summer. It is probably present in the Navajo Country the year round and it probably breeds in certain favorable sagebrush flats, notably south of Navajo Mountain and around Little Man's Lake, and probably near Keams Canyon, Polacca, Bahlakai Mesa, Lukachukai and elsewhere. Broods are out of nest at least by early July, probably earlier. The greater concentration for winter must be due to transients. It is primarily an inhabitant of sagebrush flats but is probably not as nearly obligate there as Brewer's Sparrow. The individual taken in willows at Warm Creek on Colorado River was probably a stray.

PINK-SIDED JUNCO . . . *Junco mearnsi*

A winter resident of valleys and mesas from October to April or even to early May.

Specimens: Skin, March 30, 1935, Betatakin Canyon, Arizona (GC).

Observations: Hargrave noted a single bird among flocks of Montana Juncos in Tsegi Canyon in front of Swallow's Nest, January 23, 1934, and found it common in Kiet Siel Canyon, March 24, 1934. Wetherill noted it in Betatakin Canyon almost daily, March 1 to April 6 and October 8-28, 1934-35. He recorded that they were thinning out in late March. Monson has 29 records of 268 birds extending between October 6 and May 8, 1936-38. These records are from localities well distributed over the area, mainly from the valleys and mesas. In time, they are distributed as follows: 3 records of 23 birds in October, 3 of 53 in November, 5 of 35 in December, 10 of 146 in February, 7 of 20 in April and one bird in May.

Discussion: The Pink-sided Junco is a winter resident, usually arriving in early October and leaving in April, straggling as late as May, often found in mixed flocks with other juncos.

SLATE-COLORED JUNCO . . . *Junco hyemalis hyemalis*

A casual or accidental winter resident.

Specimens: Immature ♂ taken from flock, January 24, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). Determined by A. H. Miller with the comment, "possibly connectans."

Observations: One observed at Chilchinbito, Arizona, January 13, 1939 (GM).

SHUFELDT JUNCO . . . *Junco oreganus shufeldti*

Winter resident remaining from October to March or April.

Specimens: Adult ♂, January 21, 1934, Marsh Pass, Navajo County, Arizona (MNA). Adult ♂ ♂, January 23, 1934, 7000 feet, Kiet Siel Canyon (MNA). Adult, January 23, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). Immature ♂, January 24, 1934, 7000 feet, Kiet Siel Canyon, Navajo County, Arizona (MNA). Adult ♂, April 28, 1935, near Bluff, Utah (UU). Adult, May 1, 1935, 22 miles northwest of Mexican Hat, San Juan County, Utah (UU).

Observations: Merriam (1890:96) reported this bird to be "a fall migrant not seen until September 22, 1889, after which a few were seen." At that time he was in the vicinity of Moenave and Tuba City. Loring found it common in flocks in underbrush near Bluff, Utah, November 8-15, 1893. Hargrave saw mixed flocks in Winslow, January 3-4, 1931, and saw about 20 birds at Marsh Pass and a large flock in Kiet Siel Canyon, March 23-24, 1934. Wetherill noted it regularly in Betatakin Canyon in small groups or flocks from March 1 to May 8 and September 27 to October 25, 1934-36; found it common around Kayenta, November 29-December 20, 1941, and saw flocks in Kiet Siel Canyon during January, 1934. Monson has 42 records of 659 birds distributed through the period, October 12 to February 21, 1936-39. They come from localities well distributed over the Navajo Country from Moenave to St. Michaels. Of these, 4 records of 5 birds were in October, 3 of 113 in November, 12 of 162 in December, 15 of 154 in January, and 8 of 155 in February.

Comment: This bird is a common winter resident arriving in October and departing in March or early April. Extreme dates of stragglers are September 27 and May 8. It tends to occupy the valleys and open canyons, especially areas of brush or deciduous trees. It is entirely possible that the observations may have included individuals of *J. o. montanus*, but the specimens examined have been assigned to the Shufeldt race, mainly on the basis of wing measurements, males under 76, females under 72 mm.

GRAY-HEADED JUNCO . . . *Junco caniceps caniceps*

A common migrant through the pigmy conifers in March, April and September, and a common breeder of the ponderosa pine forests of Navajo and Lukachukai Mountains.

Specimens: ♂ ♂, March 31, April 1, 1935, Betatakin Canyon (GC). ♂ ♂, ♀, June 19, 20, 1927, Lukachukai Mountains (Cantwell, USBS). Adult ♂ ♂, July 2, 1936, 8500 feet, pine forest, War God Spring, Navajo Mountain, San Juan County, Utah (UU). Juvenile ♀, July 11, 1936, 8500 feet, aspen and pine, Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Adult ♂ and ♀ (probably a mated pair), July 12, 1936, 8500

feet, aspen and pine, Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Juvenile ♀, July 18, 1936, 10,000 feet, spruce-fir forest, near top of Navajo Mountain, San Juan County, Utah (UU). Juvenile ♂, July 24, 1934, 7600 feet, Skeleton Mesa, Navajo County, Arizona (MNA). Adult ♀, August 14, 1935, 9000 feet, pine forest, War God Spring, Navajo Mountain, San Juan County, Utah (UU).

Observations: Nelson found this junco abundant in the mountains, 15 miles northwest of Fort Defiance, August 31, 1909. Skinner saw two flocks of 53 and 37 in the pines 20 miles east of Chin Lee, September 26-27, 1916. Goldman reported it common above 7800 feet in Tunicha Mountains a decade later, June 19-20, 1927. Benson encountered it on Navajo Mountain, June 16, 1933. Jenks saw several in the pines between Querino Canyon and St. Michaels about the same time, June 20, 1933. Russell found breeding birds common in the pines and sparse in the spruce-fir forest on Navajo Mountain, July 1-23, 1936, and found no significant increase in population on August 13, thus indicating that migrants had not started to arrive. Russell also found a single family just out of nest in a "glen full of yellow pines" on Skeleton Mesa, July 24, 1934. Presumably these were all local atypical birds of the Navajo Country and not the more typical transients from the north. Transient winter birds that invade the lowlands as well as the mountains have been noted almost daily in Betatakin Canyon by Wetherill, March 15 to April 30, and September 8-29, 1935. A belated record was made May 8. Hargrave noted that it was the most abundant junco in Kiet Siel Canyon, March 25, 1934. Monson has 35 records of 806 winter birds from October 1 to March 24, 1936-38, and three records of six summer birds in May and June. These winter records come mainly from lowland localities well distributed over the Navajo Country from Rio Puerco and Little Colorado rivers north to Cedar Ridge and Black Mesa.

Discussion: The Gray-headed Junco is a common breeding bird in the ponderosa pine forests of Navajo and Tunicha Mountains and extends upward sparingly into the spruce-fir forest. It may also be a sparse breeder in the patches of ponderosa pine scattered here and there in the higher mesa tops and canyon heads. More typical birds from the north also winter in the Navajo Country, chiefly in the pigmy conifers and streamside forests almost everywhere, arriving in September and remaining until March and April, occasionally straggling into May. Breeding data are few. Benson found it on Navajo Mountain, June 16. Russell found that full grown young birds were out of nest by July 4 and on Skeleton Mesa a brood just out of nest was found July 24. By August 13, Russell found no evidences of migration, but migrants began to appear in the canyons by September 8.

Classification Note: Our five adults of the local breeding birds show some variation, but average much nearer *caniceps* than *dorsalis*, especially in the bill character. We consider the local breeding race as atypical *caniceps*, but Phillips considers the Kaibab race farther west as nearer *dorsalis*. Our data indicate intergradation between the two.

WESTERN TREE SPARROW . . . *Spizella arborea ochracea*

Sparse winter resident.

Specimens: December 18, 1853, Little Colorado River at mouth of Canyon Diablo, six miles northwest of Leupp (K and M 42).

Observations: January 19, 26, February 19, 1937, Moenave near Tuba

City, three, four and two seen (Monson, 1939:168). November 8-15, 1893 common in small flocks around Bluff on San Juan River, Utah (Loring).

WESTERN CHIPPING SPARROW . . . *Spizella passerina arizonae*

A breeder of many habitats, mostly 5000 to 9000 feet altitude.

Specimens: Skin, May 1, 1935, on rim of San Juan River 12 miles northwest of Mexican Hat, Utah (UU). Specimen, mid-May, 1858, Fort Defiance (Baird 1861:5). Immature, just out of nest, June 16, 1934, 6500 feet, pigmy forest, Marsh Pass, Navajo County, Arizona (MNA). Adult ♀, June 22, 1934, 6700 feet, pigmy forest, Water Lily Canyon, Navajo County, Arizona (MNA). ♀, June 26, 1933, 8000 feet, Skeleton Mesa, Arizona (MVZ). Juvenile ♂, June 28, 1935, 7500 feet, pigmy forest, Skeleton Mesa near Long Canyon, Tsegi drainage, Navajo County, Arizona (GC). Adult ♂, July 4, 1936, 8500 feet, pine forest, near Soldier Seep, Navajo Mountain, San Juan County, Utah (UU). Nest and two nestlings, July 11, 1938, 7300 feet, sagebrush, Black Mesa northwest of Coal Mine, Navajo County, Arizona (UU). Adult ♂, July 12, 1935, 7300 feet, sage flats in pigmy forest, mesa west of Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC). Adult ♂, July 14, 1934, sagebrush, Water Lily Canyon, Navajo County, Arizona, 6700 feet (MNA). Juvenile ♂, July 15, 1935, 7200 feet, sage flats, pigmy forest, mesa west of Bubbling Springs Canyon, Tsegi drainage, Navajo County, Arizona (GC). ♂, July 21, 1933, Segi-ot-sosie Canyon, Arizona (MVZ). Juvenile ♀, July 23, 1936, 6500 feet, pigmy forest, near Navajo Mountain Trading Post, Coconino County, Arizona (UU). Adult and immature ♂♂, August 2, 1934, 6750 feet, sagebrush, Water Lily Canyon, Navajo County, Arizona (MNA). Adult ♂, August 16, 1935, 9000 feet, ponderosa pine forest, southwest side of Navajo Mountain, San Juan County, Utah (moulting), (G.C.).

Observations: Fisher (1903:36) observed it at Keams Canyon, July 17-31, 1894. Benson (1935:445) found it among the pines on Navajo Mountain and in pigmy forest on the mesas south of the mountain, June 15-25, 1933. Jenks encountered "numbers" in the pines between St. Michaels and Querino Canyon, June 20; "several" five miles southwest of Fort Defiance, June 22, and at Keams Canyon, June 26, 1933. Stevenson saw ten in the sagebrush and pigmy conifers at Chimopovi, July 29, 1934. Wetherill has records of observations in the Tsegi canyons, May 4, July 18, August 26 and October 8, 1934-36. Phillips noted adult pairs on Moencopi Wash below Tuba City, July 9, 1936. The R.B.-M.V. expedition collectors have many records. Hargrave has nine from Tsegi Canyon and branches, June 14-August 9, 1934. These are supplemented by 11 additional records of Russell mainly from pigmy conifers, 1933-38. He found it in the pigmy forest, the pines and the spruce-fir forest on Navajo Mountain, July 1-18, 1936; most common in the pines where it was observed breeding (young birds just out of nest). He also found it in Beaver Creek Canyon and on the mesas south of the mountain. Woodbury and Russell found it well distributed through the pigmy forests around Marsh Pass and on Black Mesa, June 25-July 16, 1938. It was not found in dense pigmy forest nor in oaks but was often observed in forest edges around sagebrush flats. It was also observed near Tuba City Reservoir and in Pasture Canyon, July 20-23, and September 7, 1938. Russell observed several in the Gypsum Jungle in Monument Valley, Utah, Arizona, August 15-18, 1936. Woodbury observed a juvenile transient on Colorado River 69 miles above Lee's Ferry, Utah, August 3, 1938. Monson

has 51 records of 1074 birds between April 12 and October 13, 1936-38. They are so distributed as to indicate a summer breeding resident.

Discussion: The Chipping Sparrow is a common breeder especially in the pine and pigmy forests and sagebrush, but may extend sparingly into the spruce-fir forests above and into streamside trees below. It appears to have a wide altitudinal range extending from 5000 to 9000 feet. Post-breeding wanderers may get out of this range as did the juvenile found on the Colorado River at 3250 feet, August 3, 1938. It appears to arrive in late April and depart in early October. Monson's records are the best available indicators. Extreme dates are April 12 to October 13, indicating a five or six months' stay. Nesting data are meager. Hargrave found a family just out of nest, June 16, 1934. Russell found similar families, June 30, July 5, and July 3-13. Kiss located a nest containing nestlings three or four days old, July 11. By August the young birds appear to far outnumber the adults, and considerable wandering occurs.

BREWER SPARROW . . . *Spizella breweri breweri*

A breeder of the sagebrush and thick greasewoods.

Specimens: Adult ♂, May 1, 1935, rim of San Juan River, 12 miles northwest of Mexican Hat, Utah (UU). Adult ♂, June 26, 1938, 6500 feet, greasewood flats, near Marsh Pass, Navajo County, Arizona (UU). Adult ♂ and juveniles, July 9, 1938, 5500 feet, greasewood, ten miles northeast of Marsh Pass, Navajo County, Arizona (UU). Immature, July 21, 1934, sagebrush, Water Lily Canyon, Tsegi Canyon, Navajo County, Arizona, 6750 feet (MNA). Juvenile, July 30, 1936, 6500 feet, sagebrush, four miles south of Navajo Mountain Trading Post, Coconino County, Arizona (UU). Adult, July 31, 1935, 5800 feet, sagebrush flats, Tsegi Canyon one mile above Marsh Pass, Navajo County, Arizona (GC). ♂, July 31, 1937, 7000 feet, sagebrush, Kaiparowits Plateau, Utah (UU). Adult ♂, August 3, 1934, 6700 feet, sagebrush, Water Lily Canyon, Tsegi Canyon, Navajo County, Arizona (MNA). Adult, August 8, 1936, 7000 feet, pigmy forest, east rim of Beaver Creek Canyon, Navajo Mountain, San Juan County, Utah (UU). Immature ♀, August 13, 1936, greasewoods, Tsegi Canyon ¼ mile above mouth, Navajo County, Arizona (MNA).

Observations: Merriam (1890:96) reported it was "common on the desert of Little Colorado in summer." He was there August 12-19 and September 20-27, 1889. Streater reported it was "not common" around Holbrook and Winslow, April 19 to May 7, 1893. Nelson found it around Tuba City, Cedar Ridge and Lee's Ferry, August 14-26, 1909. Hargrave thought it abundant along lower Polacca Wash, August 24, 1932. Benson (1935:443) encountered it in the sagebrush on the flats south of Navajo Mountain, June 12 and 27, 1933. Russell found it in the same place, June 20 and July 30, 1936. A score of records by Hargrave, Russell, Teall, Wetherill and Phillips attest its presence in Tsegi Canyon and its branches May 8-August 31, 1934-38, mainly from sagebrush and greasewood. Woodbury found it to be the most common bird of the sagebrush on Kaiparowits Plateau, July 27-August 3, 1937. Russell and Woodbury found it to be a common breeder of the tall greasewoods and sagebrush through the flats from Kayenta up Laguna Creek, to Marsh Pass, Little Man's Lake, Kelthla Valley and Shonto Canyon, June 25-July 13, 1938. Woodbury saw 12 near the overgrazed meadows below Pasture Canyon reservoirs, August 22, 1938, and Russell saw one bird near the upper reservoir, September 7. Monson has 32 records of 279 birds from

18 localities well distributed over the country from Moenave to Tees-nos-pas near 4-corners. These records mostly occur between April 21 and September 19, 1936-38, but there is one extra early record of February 19, 1937, at Moenave.

Discussion: This diminutive sparrow is primarily a bird of the sagebrush but will enter other vegetation that presents a similar cover pattern such as the thick greasewoods. Since the sagebrush and the greasewoods both generally occupy the valleys and flats with deep soils, whereas the pigmy conifers are more or less restricted to shallow rocky soils and slopes, this bird is largely restricted to the open valleys and flats, mostly between 5500 and 7500 feet. It undoubtedly wanders some after the breeding season and is not then so obligate to sagebrush. Post-breeding wandering probably takes it into some places where it does not breed, but June records would be almost certain indicators of breeding and there would be good probability of breeding in most July records, especially in the typical habitats of good stands of sagebrush or greasewood. The records indicate that it is well distributed over the area wherever suitable habitats occur, including Kaiparowits Plateau and the foot of Navajo Mountain in Utah, and Laguna Creek above Kayenta, Marsh Pass, many of the Tsegi canyons, Kletthla Valley, Shonto Canyon, near Pasture Canyon, and the flats near Navajo Mountain Trading Post, Arizona. Monson's June records indicate that it probably breeds near Keams Canyon, Bahlakai Mesa, Steamboat and Lukachukai and his July records at several other places. Monson indicates that it usually arrives April 10-15, and is probably nesting in May and June. The young broods appear to emerge from the nests in late June and early July. June 30, 1938, Russell observed several pairs in the greasewoods in lower Tsegi; two pairs still had young in the nest, one family was fresh out of the nest and three families had been out some time. As late as July 12 birds were found in Shonto Canyon feeding young. The latest available record is September 19.

HARRIS SPARROW . . . *Zonotrichia querula*

Probably a casual winter visitant. One record by Monson (Wilson Bull. 1937:294-95) at Moenave near Tuba City, February 9, 1937.

OREGON WHITE-CROWNED SPARROW . . . *Zonotrichia leucophrys oriantha*

A regular migrant, even if not common.

Observations: Wetherill observed both white-crowned and Gambel's sparrows around Kayenta the last week in April, 1934, and noted this bird at Betatakin, September 14 of the same year. Monson has 11 records of 43 birds during May, 1937, all of which were at Keams Canyon except one bird in Hopi Buttes, on May 17.

Comment: This bird apparently winters farther south than Gambel's Sparrow, but passes through the Navajo Country both spring and fall and should be more or less common at the proper season in migration.

GAMBEL SPARROW . . . *Zonotrichia leucophrys gambelii*

Common or abundant winter resident of habitats containing tall sheltering bushes.

Specimens: ♀, ♂ ♂, April 20, 27, 28, 1892, Noland's Ranch and

Riverview on San Juan River, Utah (AMNH). Two skins, April 28, 29, 1935, near Bluff, Utah (UU).

Observations: Loring found it common in weeds and grasses around Bluff, Utah, November 8-15, 1893. Wetherill found it common around Kayenta the last week in April, 1934, and noted it in Betatakin, October 5-17, 1934-35. Monson has 49 records of 1150 birds mainly from September 25 to March 25, 1936-38. He has two records of stragglers April 19 and May 8. These records indicate that the bird was abundant during the winter, especially in the lowland valleys where tall sheltering bushes are available for protection. It is reported from nearly all sections of the country.

LINCOLN SPARROW . . . *Melospiza lincolni*

A migrant passing through the country in late February to mid-May and September-October.

Specimens: Immature ♀, September 6, 1938, 5200 feet, abandoned farmland in Moencopi Wash, three miles southwest of Tuba City, Coconino County, Arizona, two seen (UU).

Observations: Hargrave saw several in Kiet Siel Canyon, March 25, and Wetherill noted it on the way from Kiet Siel to Betatakin, August 31, 1934. Monson saw a single bird at Moenave as early as February 19 and another one at Moencopi, March 25, 1937. Russell saw two on September 6 on Moencopi Wash below Tuba City and one September 7, 1938, near Pasture Canyon Reservoir.

WESTERN SWAMP SPARROW . . . *Melospiza georgiana ericrypta*

One record by Monson (Wils. Bull. 49:294) at Tuba City, December 19, 1936. He reports that its characteristic note helped to identify it as it perched in a willow where it was closely observed. Probably accidental.

MOUNTAIN SONG SPARROW . . . *Melospiza melodia fallax*

Winter resident and migrant.

Observations: Merriam (1890:97) reported a few birds almost certainly of this subspecies along the Echo Cliffs near Moencopi (probably near Moenave), September 21-23, 1889. Loring considered it common along the river banks and in the brush of gardens and fences at Bluff, and of Noland's Ranch near 4-corners both on the San Juan River, Utah, November 8-15, 1893. Hargrave reported two at Kayenta Reservoir, March 23, 1934. Monson has 24 records of 188 winter birds from September 15 to February 23, 1936-38. They come from Moencopi, Moenave, Tuba City, Keams Canyon, St. Michaels, Tees-nos-pas, Dinnehotso and Defiance Plateau (1937b: 295).

Comment: Having no specimens available this bird is assigned to this subspecies largely on the basis of information from surrounding regions, mainly that furnished by Allan Phillips. The R.B.-M.V. expeditions records give no hint of any resident breeding song sparrows.

MCCOWN LONGSPUR . . . *Rhychophanes mccownii*

Monson reports seeing three birds at Needmore Ranch southwest of Cameron, February 17, 1937, and a single bird on Coal Mine Mesa, December 6, 1936. It is probably a casual winter resident.

CHESTNUT-COLLARED LONGSPUR . . . *Calcarius ornatus*

Sparse or casual winter resident.

Monson counted 17 at Needmore Ranch southwest of Cameron, February 17, 1937. He saw one at Ganado, February 10, 1938, one at Tuba City, February 19, 1937, and one at Snake Butte southwest of Polacca, September 30, 1938.

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MAP
of the
NAVAJO COUNTRY
in
UTAH and ARIZONA

Scale of miles

0 5 10 20

